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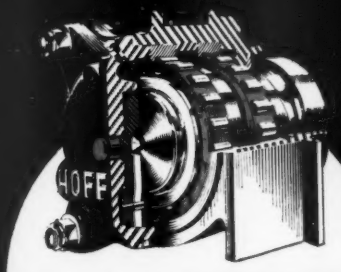

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Dual-Purpose Locomotives Among New B.R. Orders

AMONG orders totalling £8,750,000, for 80 main-line diesel-powered locomotives, recently placed by the British Transport Commission with British Railways workshops, is one for six locomotives of the electro-diesel type which is entirely new to Britain. These are designed to operate on the Southern Region under their own power as diesel-electric locomotives on non-electrified main lines and sidings using a 600 h.p. diesel-generator set, and alternatively as electric locomotives of considerably greater power on electrified lines. Two examples of the existing use of dual-purpose locomotives are in the U.S.A. and Switzerland. In the former case the application is on main lines which are only partially electrified and the latter where main-line locomotives are used for shunting duties on non-electrified private sidings. If the object of greater flexibility of operation is achieved it should lead to a reduction in the total number of locomotives needed for partially electrified areas. The electro-diesel locomotives will be built at Doncaster Works, Eastern Region. The bulk of the new orders is for 74 diesel-hydraulic main-line locomotives of 2,700 h.p. for the Western Region. Swindon Works, Western Region, will build 35 and Crewe Works, London Midland Region, 39. Deliveries will begin in 1961. Each of the diesel-hydraulic locomotives will be powered by twin fast-running engines driving through individual hydraulic transmission units. This general arrangement is common to most large diesel-hydraulic locomotives. Apart from the mechanical advantages claimed, good weight distribution, and other design considerations, the handling of equipment during construction and major overhauls is easier when compared with a single prime mover of equivalent power. These units will represent a further stage in the programme for the complete replacement of steam by diesel power in the West of England and in the Bristol area, including all principal passenger and freight trains to and from London. They will make possible an extension of the scheme announced late in 1957 for the complete operation by diesel locomotives of all rail services to the West of Newton Abbot and some through trains between London and the West. The new orders bring to over 400 the number of main-line diesel locomotives to be built in railway workshops for the modernisation programme.

Transport and the Election

WHEN this issue appears the General Election will have decided the government of the country for the life of the next Parliament. At the time of going to press the issue was still in doubt. Whatever may have been the outcome, it cannot be argued that the position of the railways or the attitude adopted by either of the major parties to them can have played any relevant part. There was no reference of any moment to the basic transport system of the country in the programme. An onlooker might have been forgiven for forming the belief that Britain was entirely dependent on its road system for the movement of both goods and passengers, and that the pride of place given to achievements in this direction and to new road projects was justified on the grounds of national necessity. Apart from these claims, one need only mention, perhaps, the concern expressed that it took longer for London goods travelling by road to reach certain Scottish towns than it did for a Russian consignment, by another form of transport, to attain the moon. It was overlooked that by rail the goods could have reached Scotland in considerably shorter time as well as in greater volume.

N.U.R. Plan for Transport

THE National Union of Railwaymen issued a policy statement on transport last weekend which calls for the co-ordination of the major forms of transport. It urges that modernisation should allow for increased railway facilities and provision for the bulk of long-distance freight to go by rail. It suggests interest-free Government loans for modernisation and relief for the British Transport Commission of some of the interest burden on original compensation stock. These two points, together with another that the Commission should not bear the cost of services for strategical or defence purposes, nor the cost of maintaining road bridges over railways and pleasure canals, are not new thoughts, but taken in conjunction with another item which looks for compensation to the Commission if it is expected to keep fares and charges below the cost of providing them, would make heavy calls on the Exchequer.

Other Proposals

THE union also urges control of long-distance road haulage by limitation of the area of operation by commercial operators and a limited radius and proof of need for "C" licensed vehicles. This again raises a long-standing controversy which has tended to be shelved recently, although the need for its solution remains as great as ever. The political and subjective aspect obtrudes most in the last five points of the policy. These are that private passenger undertakings should be transferred to public ownership and that municipal undertakings should co-ordinate with national and area schemes; that area transport boards should be made up of functional management, and replace the present boards; that Civil Service conditions should be given the workers; that guarantees should be given for workers that become redundant due to technical changes; and most revolutionary of all perhaps, that full use should be made of railway workshops even for work outside the industry.

British Standards' Heavy Programme

SOME indication of the heavy programme of work which the British Standards Institution is undertaking was given by Mr. R. E. Huffam, President, in his annual report. He referred to the 1,000 projects for new or revised British Standards now in hand and to the 2,800 technical committees which the Institution keeps in being. On the export side, he stressed the desirability of providing translations of British Standards for such markets as South America. The iron and steel industry, in conjunction with the Institution, had had prepared a series of summary sheets in five languages of the main steel standards. He reported that co-ordination and rationalisation of the standards for steel and non-ferrous metals were proceeding. In revising the standards for alloy steel and aluminium pressure vessels, attention was being given to the possibility of reducing some of the factors of safety which had been criticised as too high. Standards were being prepared for electrical machinery to provide for new insulating materials. The council dealing with codes of practice intended to carry out an investigation into corrosion of steel structures.

Overseas Railway Traffics

CANADIAN Pacific Railway revenue for August amounted to $40,264,178, compared with $39,573,789 in August, 1958. Railway expenses were $37,909,253 ($36,532,617), resulting in net earnings of $2,354,925 ($3,041,172). Aggregate net earnings for the eight months January-August were $22,100,621, compared with $21,942,693 in the corresponding period of 1958. Operating revenues of the Canadian National Railways for the month of August amounted to $61,525,000. Expenses, taxes, and rents totalled $62,671,000, resulting in a net operating income deficiency for the month of $1,146,000. In August, 1958, operating revenues were $59,239,000; expenses, taxes and rents were $58,648,000 and the net operating income was $591,000. Salvador Railway Company receipts for July amounted to colones 160,000, compared with colones 163,000 in July, 1958, a decrease of colones 3,000. Net railway earnings of the West of India Portuguese Guaranteed Railway Co. Ltd. for the 10-day period ending September 10, 1959, amounted to contos 684, compared with contos 502 in the corresponding period of 1958. Aggregate earnings from January 1 amounted to contos 10,327, compared with contos 8,486 in 1958, an increase of contos 1,841.

Progress in Eastern India

CONSTRUCTION of new lines, creation and improvement of marshalling yards, and electrification at 25kV., 50 cycles, now in progress or planned in Bengal and Bihar and referred to in recent issues of this journal show that the Eastern and South Eastern Railways of India are making vigorous efforts to increase their capacity. This is vitally necessary if they are to answer the increasing transport demands placed on them as a result of the economic development of India and more especially the growth of the steel industry. Mr. David Faed Macmillan, a former senior partner of Andrew Yule & Co. Ltd., which plays so great a part in the commerce and industry of India, stated at the East Indian Railway Officers' Dinner last week that the financial allocations made by the Government planners for railway development were insufficient for the task of enabling the railways to move traffic in sufficient quantities to keep pace with industrialisation. The restricting factor in railway development in India is now mainly lack of funds. Technical skill and railway material are available in India and from abroad. In view of the part played by railways in the national economy, the Government of India should reconsider the priorities given to the several fields of expenditure.

B.T.C. Wins "Come to Britain" Trophy

RECOGNITION of the part played by three branches of the nationalised transport undertaking, British Railways, British Transport Docks, and British Transport Waterways, in creating tourist traffic is made in the award this year to the British Transport Commission of the "Come to Britain" trophy. This bronze statuette of St. Christopher, patron of travellers, is presented annually by the British Transport & Holidays Association for the outstanding tourist enterprise of the year. The achievements of British Railways which helped to earn the trophy were electrification of the Southern Region Kent Coast lines; the Railrover ticket; and the Scottish Lochs cruise. It is gratifying that the body concerned specially in promoting tourism should acknowledge the value, for that purpose, of the improvements afforded by electrification. A description of the electrification to Dover and Ramsgate via Faversham appeared in our June 12 issue. The acceleration and other benefits are shared by boat trains in which many tourists gain their first impressions of this country. All boat expresses will be electric when the line to Folkestone and Dover via Ashford is converted by 1962. The faster and more frequent services moreover facilitate travel to Canterbury and many places of interest in Kent.

Opportunities for the Tourist

A FURTHER inducement to travel in Britain, the Railrover ticket, introduced this year, allows almost unrestricted travel for seven consecutive days between March 1 and October 31 on British Railways and the Clyde and Loch Lomond steamers operated by the associated undertaking, the Caledonian Steam Packet Co. Ltd. The charges of £22 10s. first and £15 second class, with reductions for families, enable Britain to be visited at remarkably cheap rates. The nine-day Scottish Lochs cruise, inaugurated this autumn by the London Midland Region of British Railways, provides travel through the seascapes of Western Scotland and the Hebrides, with opportunities of shore excursions and the amenities of a well-appointed ship. The *Duke of Lancaster*, normally carrying 1,800 passengers in regular cross-channel service, was specially equipped for 300 cruise passengers. A valuable contribution to the pleasure and convenience of travel to Britain is British Transport Docks new passenger terminal at Riverside Quay, Hull, intended for passengers travelling to and from the Netherlands and Scandinavia. The British Waterways five-day "Heart of England" cruises by luxury motor vessel afford unique views of the English countryside and villages.

Back-Pedalling on Belgian Electrification

THE only further major lines which the Belgian National Railways intend to electrify at 3,000 V. in the near future are now reported to be those from Brussels to Mons and, it is understood, onwards to Aulnoye to connect with the French 25-kV. electrified system, and from Louvain to Hasselt. For the time being it is not proposed to convert from Liege to the German frontier near Aachen, nor from Liege to the Luxembourg frontier at Trois Vierges, Liege to Marloie (on the Brussels-Luxembourg main line), Liege to Namur, or Namur via Dinant to another Luxembourg frontier at Athus. All these are heavily-trafficked sections, most of them severely graded, and apparently suitable for conversion. The high capital cost is understood to be a serious objection. Meanwhile diesel traction is being introduced for both passenger and goods traffic on lines not to be electrified. The railways of Belgium, a country mainly of short hauls—though there is much coal and mineral traffic with Luxembourg, France and Germany—have to contend with intensive road competition. Drastic measures to rationalise the system, including further closing of unremunerative stations and branches, are planned.

Bus Feeder Services

THE Ulster Transport Authority has stated in answer to critics that bus services as feeders of passenger traffic to the railway are generally impracticable. In the case, for instance, of the 24½-mile Belfast-Larne line, where, it is assumed, only two intermediate stations would remain open, the Authority stresses the difficulty of maintaining shuttle bus services between adjacent pairs of stations and reasonable travel facilities between all points along the route by a combination of train and bus. The maximum length of any U.T.A. bus route is 90 miles, but in no case is the volume of through traffic appreciable. The Authority operates fast diesel trains between principal traffic centres, but combined train and bus facilities are few. The number of railway passengers is declining, not because of

bus competition, but because of the increasing use of private motorcars, some of which are hired illegally; of hire cars; and of "minibuses" (small buses) used as hire vehicles. It has been said that everybody in Northern Ireland owns a motorcar or has a friend who owns one, or is too poor to travel. Railway and bus undertakings elsewhere may be more fortunate, not least because distances are longer, but the transport problems of Ulster, shared by regions such as Ceylon and Tasmania, deserve study.

English Electric Locomotives in Argentina

THE batch of 21 1,000-h.p. diesel-electric mixed-traffic main-line locomotives supplied to the Argentine State Railways by the English Electric Co. Ltd. during the past 12 months for the metre-gauge General Belgrano Railway are generally similar to five ordered in 1956 by the Buenos Aires Provincial Railway, since absorbed into the Belgrano system. The design, described elsewhere in this issue, follows well-known principles established many years ago by the manufacturers. Completion of the delivery stage of the contract represents a further example of successful team work by important elements of the English Electric group including the Vulcan Foundry Limited, Robert Stephenson & Hawthorns Limited, and Napier Limited. The last-named supplied the exhaust turbo-chargers which are standard equipment on the English Electric 8 SRKT in-line diesel engines. The de-rated site output is 940 b.h.p. at 850 r.p.m. Total weight is 73 tons and, with the A1A-A1A arrangement, tractive effort at the wheel rims is 22,710 lb. continuously at 11.5 m.p.h. The arrangement of the single driving compartment at one end with narrow machinery casing gives good vision in both directions of travel. Governor and electrical controls are designed for synchronous operation when the locomotives are working in multiple unit.

Acceleration of Main-line Electrification

THE recently published report on the re-appraisal of the modernisation plan for British Railways stated that it was hoped to accelerate by one or two years the date for completing the whole of the electrification of the London Midland Region main line from Euston to Birmingham, Crewe, Liverpool, and Manchester.

Over the past few years the London Midland Region has been able to cope with the work of electrification and modernisation without any undue strain on the operation of passenger service, but work has now reached a stage where the Region is unable to compete with the modernisation plan without drastic changes in main-line schedules. To enable work to proceed at an increased tempo all London Midland Region express services between Euston, Birmingham New Street, and Wolverhampton High Level will be suspended from November 2, but an augmented service will be given on the Western Region between Paddington, Birmingham Snow Hill, and Wolverhampton Low Level. This will mean that Coventry, which is on the main London Midland route between Rugby and Birmingham, will no longer be served direct by express trains from Euston. Certain main-line trains to and from Euston will call additionally at Rugby and from there passengers will travel by diesel train to Coventry.

There is a certain amount of intermediate travel on the line and the alterations will inevitably cause some inconvenience to these passengers. Some semi-fast trains from Euston will be retained to cater for Watford, Northampton, and Coventry passengers.

Between Rugby and Euston there is a very dense pattern of train working, and the amount of work to be done necessitated a considerable thinning down in the number of trains using the line. The existence of an alternative route to Birmingham and Wolverhampton over the Western Region lines enabled this to be done with the minimum inconvenience to the travelling public. It is estimated that some 2,500 passengers use the Western Region route each day. The number of passengers moving over from the suspended London Midland Region service is expected to be about 1,500 to 2,000 a day. Certain Manchester trains will also be diverted from the Euston route and will run instead to and from St. Pancras. The diversion of some of these trains will start from October 24. The present sleeping car services between Euston and Manchester London Road will continue to run, but will leave a little earlier.

A large proportion of the line between Rugby and Stafford is only double track, one line up and one line down. With such an arrangement it is difficult to carry out work under traffic, so complete possession of the line is being arranged on Sundays. All main-line trains will have to be diverted via Bescot, Stechford, and Coventry, adding some 20 to 40 min. to their running time. Inevitably all weekday expresses between Euston, Manchester, Liverpool, and the North West will have their journey times increased by up to 20 min., but alteration of the times of Anglo-Scottish day expresses has in some cases reduced running times. This has been achieved by reducing the loading of the trains, and for this reason the "Royal Scot" and "Midday Scot" will run with limited accommodation and all seats will be reservable in advance.

Over the past year the London Midland Region has been campaigning hard to promote its assured delivery freight service. The Region has no intention of undoing the good work already done in capturing valuable freight business, much at the expense of road transport, and is, therefore, maintaining this service at full strength.

Without taking bold and imaginative action the essential work of main-line electrification could not be accelerated above its present mediocre pace. The alterations to services inevitably will cause inconvenience to a minority of passengers, but they will enable the Region to concentrate all efforts on the scheme so as to make possible improvements in service under electrification and so benefit British Railways and the travelling public alike.

India's "Steel-plants Railways"

IN the course of a recent address to the Indian Institute of Technology at Khargpur, Mr. G. P. Shahani, General Manager of the South Eastern Railway, explained how in the current planned development of Indian economy his railway was playing a vital and indispensable role. After outlining the history of the railways in the country and of their Five Year Plans, he pointed out that the First Plan was devoted to post-war rehabilitation for which the total allocation of all railways was Rs. 400 crores, £300,000,000.

The second and current Five-Year Plan was, he said, very much more ambitious and was the beginning of a great effort to develop the resources of India and its mineral wealth in particular. Consequently, the allocation for the five years 1957-58 to 1961-62 was nearly three times the size of that under the First Plan, namely, Rs. 1,125 crores or roughly £844,000,000 for the whole Indian 34,000-mile system. With this sum it should be possible to carry annually 168,000,000 tons of freight and to increase passenger traffic by 15 per cent within these five years. This vast expenditure on construction and other works on the railways was already bearing fruit in. the vital assistance it was affording to the present remarkable expansion of industry. Hand-in-hand with new works the railways were meeting the challenge of ever-increasing freight traffic by adopting more efficient and better operational methods.

In this connection, Mr. Shahani pointed out that his railway was already moving 3,200-ton trains each hauled by two of the diesel units recently purchased from the United States, whereas a few months previously it had been possible to work trains of only 1,600 tons with steam locomotives. Ancillary to these improvements and making them possible had been the extension of crossing-loops to accommodate the longer trains.

The S.E.R. was so intimately associated with the growth of the steel industry that it had become known as the "Steel-Plants Railway." For it served not only two of the old-established private steelworks, Tatanagar and Burnpur—whose capacities were being more than doubled—but also two new ones at Rourkela and Bhilai, and also Durgapur to some extent as explained below. Both Rourkela and Bhilai plants each had an initial capacity of a million tons but was capable of expansion to two millions, the speaker said. For every million tons produced it was necessary to move about five million tons of raw materials. For instance, the Bhilai steelworks required feeding with 2,500,000 tons of iron ore, 2,000,000 tons of coal, and 760,000 tons of limestone as well as manganese and dolomite, to produce its million tons of

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steel. Though Durgapur was on the Eastern Railway, the South Eastern was having to carry all the iron ore, limestone and dolomite its plant required. In this and some other cases the raw materials had to be moved long distances. The railway also had to cater for the towns and subsidiary industries springing up in the vicinities of these plants and elsewhere.

Mr. Shahani expected, therefore that by 1961, some 630 wagons of finished steel and 3,260 wagons of raw materials would have to be moved daily by his railway, and that in all about 6,900 wagons—as compared with 3,200 in 1956-57—would have to be loaded with freight of all kinds daily. To meet such an increase in traffic, his administration had programmed to double over 450 miles of line, to construct more than 250 miles of new lines, to renew some 1,200 miles of track, and to electrify nearly 350 route-miles. It was also remodelling yards, rebuilding bridges and improving workshops.

To meet these remarkable commitments, the S.E.R. had been allotted Rs. 207 crores or £155,000,000 under the Second Five-Year Plan, a figure that was one-fifth of the total allotment to all the eight railways in India. This expenditure would enable the S.E.R. to move half the total increase in freight traffic on all Indian railways expected under that plan.

Robert Stephenson : 1803-1859

TWO engineering careers of outstanding importance in the establishment of railways terminated within a month of one another in the autumn of 1859. That of Isambard Kingdom Brunel was the subject of a centenary tribute last May in connection with the anniversary of the formal opening of his last railway masterpiece, the Royal Albert Bridge, Saltash; we referred both to the celebrations, and also to some of Brunel's outstanding work, in our issues of May 1 and 8. Next week marks the one-hundredth anniversary of the death of the other great railway engineer—Robert Stephenson. Almost inevitably, the similarities and contrasts of the parallel careers were considered both then and subsequently, and indeed, this was expressed in the obituary notice in *The Times*. It began thus : " The death of Stephenson comes with startling rapidity upon that of Brunel. Both men of rare genius, and both occupying a sort of double throne at the head of their profession, they have gone to their rest together, and their rivalry has ceased. Distinguished sons of distinguished fathers, the two men who in these latter years have done most to perfect the art of travel, and in this way to cultivate social intercourse, multiply wealth, and advance civilisation, have been struck down at one fell swoop in all the maturity of their power."

In a recent assessment, Dr. W. H. Chaloner observed that the operations of the Stephensons were characterised by solidity of workmanship and cautious finance, in contrast to the brilliant and costly ideas of some of their contemporaries. Brunel, in his search for the best railway and the best steamship that could be devised, may make a greater appeal to the imagination, but the object of the Stephensons was to make a railway that would pay, and in this aim they generally succeeded.

Robert Stephenson was born at Willington, on the Tyne, on October 16, 1803. A year later his father moved to the West Moor Colliery and occupied the cottage at Killingworth which was his home until he achieved fame. There Robert's mother died of tuberculosis in 1806. With his steadily improving financial position, George Stephenson gave his son as good an education as his circumstances permitted at John Bruce's Percy Street Academy in Newcastle. Between 1819 and 1822 he gained practical experience in coal mining at West Moor under Nicholas Wood, and then studied for six months at the University of Edinburgh. There seems little doubt that George deliberately trained his son to supplement and surpass his own achievements, and the younger man soon assumed the position of a partner. The famous locomotive works of Robert Stephenson & Co. was established on June 23, 1823, with Robert as managing partner, although he was then only 19 years old. Eight years later he joined with Charles Tayleur in founding the Vulcan Foundry at Newton-le-Willows. Thereafter, his career comprised a series of successes in locomotive engineering, railway construction at home and abroad, and bridge building.

In the late 1820s and early 1830s the work of father and son was too closely interwoven to admit of assigning exclusive honours. They shared the triumph of the *Rocket ;* Robert was appointed engineer of the Leicester & Swannington Railway in 1829 because his father was then too greatly engrossed on the Liverpool & Manchester Railway to accept the invitation ; they became joint engineers of the London & Birmingham Railway in 1830. On September 7, 1833, however, Robert became engineer-in-chief of the London & Birmingham Railway (with the approval of his father) at a salary of £1,500 per annum, plus an allowance of £200 for contingent expenses, and undertook the whole work of construction. Its successful completion in 1838, including the famous Kilsby Tunnel, resulted in Robert's services being in constant demand, and he was heavily employed in railway work, whereas George gradually withdrew, and spent his later years giving increasing attention to the coal mining enterprises he had launched in the Midlands. Robert's income during the Railway Mania was " large beyond any previous instance of engineering gain " —possibly some £30,000 a year—but his health proved unequal to the pressure of the demands on his skill and knowledge. Nevertheless, he was responsible for a very considerable proportion of the early main-line railway system north of the Thames.

Robert Stephenson, the younger Brunel, and Joseph Locke have often been called the great triumvirate of railway engineers. They all undertook a variety of work that is almost unthinkable in an age of specialisation, and, with their passing (Locke died in 1860), what has been called the heroic age of engineering was over. With all of them, it is impossible to name one feature as their greatest contribution to engineering, but with Robert Stephenson (as with Brunel) it is probable that bridges form the most striking memorial. His High Level Bridge at Newcastle (1849) has completed 110 years of arduous service, and, although scheduled in 1950 as an Ancient Monument, still carries heavy rail and road traffic far in excess of anything contemplated when it was built. The Britannia Tubular Bridge across the Menai Straits (1850) remains as a world masterpiece of its kind, and is to Robert Stephenson's reputation what the Royal Albert Bridge at Saltash is to Brunel's. Stephenson's Victoria Tubular Bridge across the St. Lawrence at Montreal was opened on November 24, 1859, six weeks after the death of its designer ; the first passenger train crossed on December 17. It is 10,284 ft. in length, and for many years was the longest bridge in the world. It does not survive in original form, as it was rebuilt as a girder structure on the original piers in 1898.

From 1856 to 1858 Robert Stephenson was President of the Institution of Civil Engineers, and on June 25, 1857, he received the Honorary degree of D.C.L. at Oxford, together with I.K. Brunel and others. The King of the Belgians had created him a Knight of the Order of Leopold; for services to Norway he received the Grand Cross of St. Olaf; and he was elected a Fellow of the Royal Society in 1849. He became M.P. for Whitby in 1847 in the Conservative interest and represented the town until his death. In view of work for railways in Belgium, Canada, Denmark, Egypt, Germany, India, Norway, Switzerland, and Tuscany, he was a figure of world-wide reputation. He died on October 12, 1859, at the age of 55 and was buried on October 21 in Westminster Abbey. The funeral procession passed through Hyde Park with the express permission of Queen Victoria.

Italian State Railways in 1958

THE management of the Italian State Railways this year has issued an exceptionally well produced and illustrated report, for a copy of which we are indebted to the General Manager, Dr. Severo Rissone. The preface is by the Minister of Transport, Senator A. Angelini. In it he points out how essential it is for the community to understand the part played in its life by the railways and how closely they are linked with its welfare.

To the difficulties facing all railway systems with the growth of other forms of transport must be added some peculiar to Italy, arising from geographical, industrial and economic conditions. The deficit, which had been increasing from 1954, declined again after 1957 and for 1958 totalled 55,693,000,000 lire.

The working is therefore much more satisfactory than appears at first sight, but efforts are being made to rationalise it still further and introduce modern methods in all departments. Time and capital will be required, however, to carry the programme to completion. Some charges, such as those for pensions, are rising but traffic receipts have been improving since 1954. Fares and freight charges are relatively low on the Italian State system. Total receipts in 1958 were 1·6 per cent above those for the preceding year. Since the opening of the present year, however, the effect of the resolutions adopted by the Conference of European Ministers of Transport has been making itself increasingly felt, their object is to introduce the best rates possible, from all points of view, and foster all types of traffic, including international traffic which is of great importance to the Italian economy.

To test public opinion some 3,000 passengers, approached at random on 14 different parts of the system, were interviewed with the aid of a carefully prepared questionnaire. The results are now being studied to see what new or modified services and facilities can be introduced to render rail travel more useful and attractive. The question of co-ordination of transport also is being investigated in the light of recent experience, and it is possible that certain lines may be replaced by road services. Some special services, such as the " car/sleeper " train between Milan with Ostend, have proved popular, as have the extension of facilities for booking seats by telephone and the " drive-your-own-car " service provided at certain principal stations.

A five-year programme of new vehicle construction includes the provision of some special types, such as refrigerator vans. These, however, are in full demand only for a few months in the year and therefore a number of ordinary vans have been equipped with removable refrigeration gear. These vehicles are leased to traders for four months each year over a period of nine years, and at the end of 1958 more than 370 were available. Although private siding traffic has lately shown some decline, there is a demand for more sidings to be laid in. Of the 140 million train-miles run in 1958, 85 million were electrically operated and additional electrification has been brought into use since the close of the year. Coal consumption has been falling steadily since 1955 and that of other fuels during the last two years. The average distance travelled by passengers has been increasing since 1954. Second class accommodation was introduced during 1958 on a number of fast trains previously providing only first class, and the supplementary fares charged on certain trains were abolished. There were many accelerations of passenger schedules. The train and car ferry service across the Straits of Messina again carried more traffic and improved loading arrangements enabled much better services to be run. A similar ferry service to Sardinia is also to be established.

The system comprises some 10,350 route miles, of which just over 7,600 are single-line; tunnels total in length 565 miles and bridges and viaducts nearly 390. Maintenance is therefore heavy and widenings costly, but some were effected in 1958. There are still 9,000 semaphore type signals and about the same number of light signal units. Electric power signalling is being continually extended, and for large stations the push-button type of relay equipment is standard; during 1958 this was applied at Genoa and elsewhere. Much older equipment also is being modernised to give better facilities at moderate cost. The Morse telegraph is giving place to the telephone, and teleprinter services are being extended. It is intended to apply telephones at all attended crossings; the half-barrier type of protection was applied experimentally during the year and in consequence a number of other installations are now under construction.

Improved electric and diesel and other rolling stock was brought into use and gradually the older stock is being eliminated; the railways placed very large orders of many kinds during the year with private industry and the improved coaching stock, being brought progressively into service, is finding general approval, as also are the much faster overall timings given with it on several principal routes.

The management is co-operating with the International Union of Railways (U.I.C.) and other bodies in carrying out research and experimental work aimed at obtaining more comfortable trains, smoother riding, much improved station amenities and other benefits that appeal specially to the passenger.

Freight Movement on American Railroads

(By a correspondent)

IN eleven and a half years from 1948 to June, 1959, the American railroads systematically remodelled their methods of operating traffic on 220,500 route-miles. The most striking change was the almost universal adoption of diesel motive power. In 1947 the railroads had a fleet of 35,100 steam locomotives, 820 electric, and 5,770 diesel electric units. By 1948, they were convinced that diesel motive power was more efficient and more economical than either steam or electric power for main line working. During the six years to 1953 they installed diesel units at the average rate of 2,820 a year; 207 new steam locomotives were also put into traffic but no more were ordered after 1952.

Over the five years, 1954 to 1958, the railroads installed 4,820 additional diesel units and 500 more in the first half of this year. At the end of June the locomotive stock consisted of 1,002 steam engines, 550 electric units and 28,030 diesel units. The rise of the diesel virtually eliminated steam power and superseded electric traction on several lines. There were also 33 gas turbine locomotives, which are started by an auxiliary diesel engine, in use; the Union Pacific prefers them for its fast long-haul freight services.

The cost of the changeover to diesel power was the largest item in programmes for additions and betterments which the railroads carried through in eleven years from 1948 at a total expenditure of $12,756 million. About 70 per cent of that amount went on equipment of all kinds and 30 per cent on improving permanent way and structures. It became a common practice to mechanise marshalling yards. A spectacular example was the Pennsylvania Railroad Conway yard, 22 miles west of Pittsburgh, where 9,000 wagons a day can be shunted and dispatched direct to destination with a saving in transit time. The Santa Fe report for 1958 had two clear illustrations of the 32-track Corwith yard, Chicago, where push-button operation from a central tower sorts the wagons, some of them equipped with a " shock control " unit to protect the contents from damage.

Centralised traffic control is another device which expedites movement and holds down operating costs. As far back as 1955, this system of remote control of points and signals by an operator located at a suitable traffic centre was in force on 27,000 miles of track, largely in areas with a sparse traffic. It is now being extended to busy sections of line to cater for dense traffic, and keep down maintenance costs by using main tracks in both directions. The Pennsylvania, with its dense traffic, now has 1,250 miles of C.T.C. track.

The widespread use of power machines improved track upkeep and large quantities of new and heavier rail were laid. When the 1957 renewal programmes were finished, about 60,000 miles of track had rails weighing 120 pounds, or more, per yard. Physically the railroads were in fine shape before the business recession of 1958 occurred. A comparison of 1948 and 1957 operating results will show the remarkable progress made in freight movement.

Though during these 10 years freight traffic decreased by 8 per cent from 1,507 million tons to 1,380 million, revenue ton miles declined by only 3 per cent to 618,193 million, as the average haul lengthened by 22 miles, or 5 per cent, to 428 miles. The wagon load of 33 tons was unchanged, but the net train load increased by 263 tons, or 22 per cent, to 1,439 tons. The daily mileage of freight locomotives rose by 24 per cent from 117 to 146 and train speed between terminals quickened by 16 per cent from 16·2 m.p.h. to 18·8. Freight train hours, including shunting time at roadside stations, were reduced by over a third from 36,173,230 to 23,740,270. These factors combined to raise the hourly output of freight train operation each year after 1948 until it reached 59,186 gross ton miles in 1957, a total advance of 19,283, or 48 per cent.

During the 10 years freight revenue increased by 11 per cent, and freight-operating expenses were 14 per cent higher. The railroads did well to hold the freight operating ratio at 70 per cent in 1957 compared with 69 in 1948. In 1958 the low volume of traffic led to slight decreases in wagon and train loads, as well as in the daily mileage of freight locomotives. Throughout the year there was an ample supply of motive power, the average freight diesel locomotive consisting of 2·75 units compared with 2·58 in 1957. These powerful machines set up a new record of 19·2 miles an hour for train speed

XUM

between terminals and lifted the hourly output of freight train operation to an all-time high of 60,807 gross ton-miles. In the heyday of steam power it was an axiom that freight trains moved faster when traffic slacked off, but produced fewer ton-miles. The upsurge of the diesel locomotive appears to have upset that theory so far as the American railroads are concerned. Their methods of manipulating units of a similar type and power have no doubt helped to make a success of the new prime mover.

While freight movement was subject to fluctuations of varying intensity, the volume of passenger movement declined persistently after 1948, until it was 43 per cent lower last year. Passenger services were withdrawn gradually from 52,830 miles of line, while passenger locomotive miles were reduced by 42 per cent from 385 million to 223 million. The number of locomotives assigned to passenger service from the total stock dwindles away and freight movement is becoming more than ever the predominant business of the American railroads.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

Average U.S.A. Wagon Loads

October 2

SIR,—The paragraph on page 233 of your October 2 issue might have explained that it dealt with average loads at starting point of traffic passing in full wagon loads. The calculations leave out of account 4,402,000 tons of "smalls," which occupy many lightly loaded wagons. When the Association of American Railroads refers to wagon load, it means the statistic "net ton miles per loaded wagon mile," which stood at 33 last year against 33.4 in 1937.

The increase in the load of mineral wagons last year was not a sign of profit. Iron ore loaded to 69 tons a wagon compared with 67 in 1957, but 39 per cent fewer wagons were forwarded and new high-capacity wagons would be used in preference to old stock. Wagons assigned to iron ore traffic earned 31 per cent fewer dollars in 1958 than in 1957. A record can be set up at too high a price!

Yours faithfully,

R. BELL

Clacton-on-Sea

Good Service from British Railways

September 26

SIR,—One hears so much criticism of British Railways passenger services that I feel bound to record my treatment at the hands of the Scottish Region in August.

My train from Exeter, scheduled to arrive at Glasgow Central at 7.30 a.m., arrived just too late to connect with MacBrayne's Ardrishaig mailboat, which leaves Gourock at 9.30. My intention had been to take the Ardrishaig boat as far as Tarbert, where it connects with the 1.30 p.m. boat to Islay, my destination. The delay was due, I believe, to the extensive works in progress at Crewe.

As soon as I alighted a voice on the loudspeaker asked passengers for Islay to report to a certain inspector, who would make arrangements. When the inspector had ascertained that I was the only passenger and that there was no hope of my catching the steamer at Gourock, he handed me over to the stationmaster. After a wait of only 5 min. I was told that the District Commercial Manager had arranged for a motorcar to take me 98 miles to Tarbert. The car, an exceptionally comfortable one, did the journey in very good time over difficult roads, and I reached Tarbert with half-an-hour to spare. My one regret was that I missed the excellent breakfast served on R.M.S. *Loch Fyne*.

This is but one instance of the courteous service that I have always received from British Railways, which, in this respect, has not gone the way of certain other publicly-owned institutions.

Yours faithfully,

MARTIN I. ALLEN

Birchfield School, Tettenhall, Staffs.

Flares for Train Protection

September 30

SIR,—Colonel W. P. Reed, Ministry of Transport Inspector, has reported on the accident between Urmston and Trafford Park in December, 1958. A Liverpool—Manchester express collided with the jib of a contractor's crane and its load of concrete, which had fallen across the line. The train was de-railed and then struck by a Manchester—Wigan train travelling on the other track. A man who had got off the first train was killed by the Wigan train and 37 other passengers and enginemen of both trains were injured.

Colonel Reed stated that the accident gave grounds for reviewing the advisability of adopting the flare on British Railways. If the crew of the Manchester-bound train had been in possession of flares, the driver of the Wigan train would have been warned of danger ahead and would at least have been able to whistle and probably to have effected a considerable reduction in speed.

Some years ago, after the disaster at Wilmslow, when an express ran into the back of another which had stopped because the communication cord had been pulled, I pointed out that the crash would not have occurred had the crew of the stopped train been equipped with flares. The following train did not see the rear light of the stopped train until too late because of the bend in the line and a bridge. The reflection of a flare would have been seen in time to enable the driver of the following train to pull up.

Flares are in universal use in North America. They are extremely bright and can be seen from a considerable distance, even in daylight, and all train crews are equipped with them. In view of what Colonel Reed had to say, it is apparent that train crews here should be similarly equipped. The cost would be comparatively small and safety would be considerably enhanced.

Yours faithfully,

G. RICHARD PARKES

The Thorns, Park Road, Hadfield, Manchester

Oxted Line Services

September 21

SIR,—In the editorial note and news article in your September 18 issue, on the plan to introduce diesel railcars on Oxted lines, it seems to be implied that the increase in traffic in the last two or three year is due to the increase in population in the area.

No doubt this is a factor. It is unfashionable to give any credit to steam traction, but may I point out that in this same period steam locomotives of modern design have been introduced together with an improved regular-interval service?

Yours faithfully,

J. B. LATHAM

3, Church Path, Woking

Preservation of L.N.W.R. Locomotives

October 1

SIR,—May I appeal for the preservation of one of the still numerous L.N.W.R. 0-8-0's? This class started in 1892 with the Webb small-boilered 2-cylinder simple No. 2524—in effect, an enlargement of the Webb 0-6-0 coal engines of 1873. They were developed by Webb's successor, Whale, through conversion of his predecessor's compounds, and the addition of larger boilers. The final and perfecting development was carried out by Bowen Cooke and completed in 1921. These engines may thus be said to be representative of the Webb, Whale, and Bowen Cooke eras, over nearly 50 years.

The class totalled, ultimately, 572, the largest owned by any single British railway at that time. It became the standard goods class of the L.N.W.R., and was the only type on that railway to be treated as a standard class by the L.M.S.R. That also is a reason for preservation. One locomotive should be restored to its L.N.W.R. condition.

Yours faithfully,

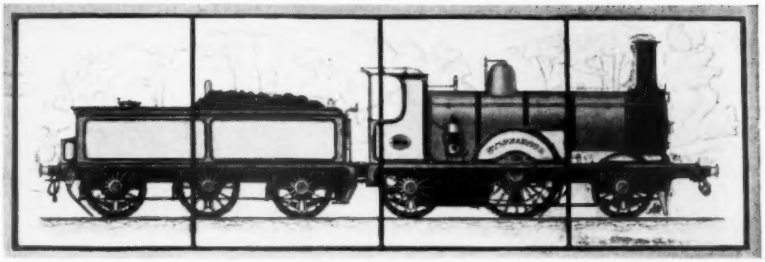
J. P. BARDSLEY

Bonds Fold Farm, Garstang, Lancs.

THE SCRAP HEAP

Stephenson Locomotive Society, 1909-59

The golden jubilee celebrations of the Stephenson Locomotive Society, of which Mr. J. N. Maskelyne is President, included a dinner at the Windsor Castle Hotel, London, S.W.1. Mr. T. P. Hally Brown was chairman; Mr. D. S. M. Barrie, Assistant Secretary General, British Transport Commission, replied to the toast of the guests; and Mr. R. A. Smeddle, Chief Mechanical & Electrical Engineer, British Railways, Western Region, proposed the toast of the Society. The menu card bore a reproduction of a painting by the late Mr. R. Barnard Way, of L.S.W.R. Drummond "T9" 4-4-0 No. 773. Immediately before the dinner Mr. W. O. Skeat presented a stained-glass panel by his brother, Mr. F. W. Skeat, depicting L.B.S.C.R. Stroudley 2-2-2 *Stephenson*. This engine, built in 1881, the centenary year of George Stephenson's birth, has been adopted as the emblem of the Society. The panel is to be affixed in the front window of the Society headquarters at 32, Russell Road, W.14.



L.B.S.C.R. 2-2-2 locomotive "Stephenson" depicted in stained-glass panel

Date of Robert Stephenson's Birth

Robert Stephenson never knew with certainty the precise date of his birth. He gave December 16, 1803, to Samuel Smiles for inclusion in the "Life of George Stephenson," but is said to have asked for it to be altered to October 16 in the fifth edition. November 16 was the date stated by George when a dinner was given to the son in 1839 by the contractors of the London & Birmingham Railway, and the November date was inscribed on Robert's coffin. Nevertheless, December 16 was the date given in the obituary notices in *The Times*, the *Annual Register*, and the *Gentleman's Magazine*. In the "Dictionary of National Biography" the date is given specifically as "October 16 (not November)" and this is probably correct. Robert Stephenson was baptised on January 22, 1804, in what was then part of the parish of St. Peter, Wallsend, and the date of birth inscribed in the register is October 16, 1803. There was, of course, no national registration of births at the time. October 16 is the date on the statue outside Euston Station.

East of Liverpool Street

Trains from Liverpool Street creep uncertainly along low, wooded estuaries, and run on stilts above marshes, and amble over dreaming cornfields to nineteenth-century seaside towns, to thatched villages and blind-fronted, withdrawn country houses in the last part of England to get commercial television. Most of these trains seem to get delayed at night, stuck behind an endless, creeping bucolic traffic in sugar beet; there are long waits in misty fields while one imagines the driver getting out, striking matches to look at obscure signs defaced by gipsies; sometimes there are hurried footsteps and voices down on the track (to get help for a signalman found murdered?).

The boat train flashes briefly past in the night, full of spies and international engineers and actresses, leaving us in our low fields. It really has nothing to do with the Eastern Region, any more than the famous electrification scheme. These reminders of modern reality touch it but vaguely, like light diffracted under water. For years my train has been slowed down to go gingerly past gangs of men trancedly laying drains, nay, even putting up girders to carry cables; but no one believes that the great dynamos will really start turning, unless possibly to speed those boat trains.—*Paul Jennings in "The Observer."*

Sit Tight—for a 10-Mile Ride

Scores of angry home-going businessmen and women staged a sit-down strike on a rush-hour Underground train. . . . They refused to get off a Central Line train which stopped at Stratford East Station with door trouble. An inspector and a coloured guard argued with them for several minutes. Then the train carried them through seven stations on a 10-mile non-stop trip to Hainault, where it was taken out of service.—*From the "News Chronicle."*

Provincial Piccadilly

What has come over Manchester? Can it leave nothing that is well alone? . . . It was at 12.20, when a four-line announcement arrived that when Manchester's London Road station is rebuilt it will be known as Piccadilly. . . . Exactly why a new name is needed is not adequately explained. . . It is not as if London Road were some insignificant terminus. One of the main gates into and out of Manchester, it has stood for nearly 100 years as a solid symbol. Much of Manchester's history has flowed through it. Generations of Lancastrians have known its grimy ugliness with affection. And even though British Railways may now be going to put up the handsomest of modern edifices . . . . "Piccadilly" is not likely to catch on very fast.—*From "The Times."*

Late Arrival

Bradshaw may be a little late this year,
For reasons which, it should be made quite clear,
Have naught to do with the barometer,
Which, for so long, seemed indisposed to stir.
Bradshaw may be a little late and so,
We hope, will Jack Frost's onset, as we go
Striding, dryfoot, along the autumn lanes,
Stepping unmoistened in and out of trains.
If *Bradshaw* should be late, I feel no shame
In hoping winter, too, will be the same;
So may the loveliest summer we remember
Hang on, like *Bradshaw*, till at least November!

A. B.

Novel Nameplate

Nameplate of former G.W.R. "Saint" class locomotive No. 2944, acquired when the engine was broken up. The brass is kept burnished

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

Railway Bookstalls

The Railway Board has set up *ad hoc* committees for selecting standard books in English and regional languages for railway bookstalls in addition to books usually stocked.

Diversion of Central Railway Main Line

The existing railway line between Khaigaon and Piplani on the Khandwa-Itarsi section of the Central Railway main line is likely to be submerged after construction of the Punasa Dam. The Railway Board has sanctioned a preliminary engineering survey for diversion of the line between Khaigaon and Piplani.

Diva-Panvel-Uran Line Survey

The Railway Board has sanctioned the final location survey for the construction of the Diva-Panvel-Uran broad-gauge line on the Central Railway. The construction of this line, 32 miles in length, is expected to help improve the economic growth of this part of the under-developed Konkan region of the Central Railway. The line is also expected to relieve congestion around Bombay arising from industrial development.

Madras Central Station Reconstruction

Madras Central Station is to be remodelled at a cost of over Rs. 10,000,000 to deal with the increasing Second Plan traffic. The station was constructed in the latter part of the 19th century, and has since then undergone very little remodelling apart from minor additions and alterations carried out from time to time. The yard accommodation is extremely cramped and facilities for handling passenger and parcel traffic are most inadequate.

The scheme provides for more and longer platforms, increased washing facilities in a new coaching yard to be constructed at Basin Bridge, and better facilities for inspection, maintenance, stabling, train examination, and repairs.

CEYLON

Avenues of Promotion

The Government Railway has adopted a scheme for creation of avenues of promotion for staff in lower grades, such as, signalmen, shunters, goods checkers, and engine cleaners. Subordinate staff who prove themselves suitable can now achieve positions such as assistant station-master, guard and engine driver.

NEW ZEALAND

Seat and Sleeping Berth Reservations

Passengers travelling by New Zealand Railways railcar and express train services, and by the Railways Department long-distance road services, are now able to reserve seats and sleeping berths up to six months ahead of the date of travel. The previous booking period was three months.

EAST AFRICA

Central and Tanga Lines Link

At a recent meeting of the Transport Advisory Council the question of linking the Tanganyika Central and the Tanga lines was considered and the advantages accruing from the construction of such a link were discussed in detail. The Railway Management reported that since its last meeting held in April of this year, when the Transport Advisory Council approved the expenditure of £18,000 on an engineering survey of the 117-mile route from Ruvu to Mnyusi, it had been possible to make a close examination of the economic case for the building of the new line.

This study revealed that, after taking all the factors into account, the linking of the two systems by railway would strengthen the East African economy and direct movement by rail would become possible between the main towns of the three territories. It would also provide an improvement in the competitive position of the E.A.R. & H. and of traders using E.A.R. & H. services, because transit times between Kenya, Uganda and the Northern Province of Tanganyika on the one hand and Dar es Salaam and the rest of Tanganyika on the other would be reduced.

The Transport Advisory Council accepted in principle that there was a case for the link, and asked that full details of the estimated cost should be made available after the completion of the engineering survey when a decision would be made in the light of other financial commitments and priorities with which the East African Railways & Harbours were then faced.

SOUTH AFRICA

Diesel Locomotives for S.A.R.

The first of 115 universal type diesel-electric locomotives which the International General Electric Company is building for the South African Railways, has been completed at the company's Erie works. This and 18 other locomotives, scheduled for completion in the next 20 weeks, will be shipped from New York to Durban. It is expected that the balance of the locomotives will be completed by the end of 1961. The order, valued at $28,000,000, was placed by South African Railways in September, 1958.

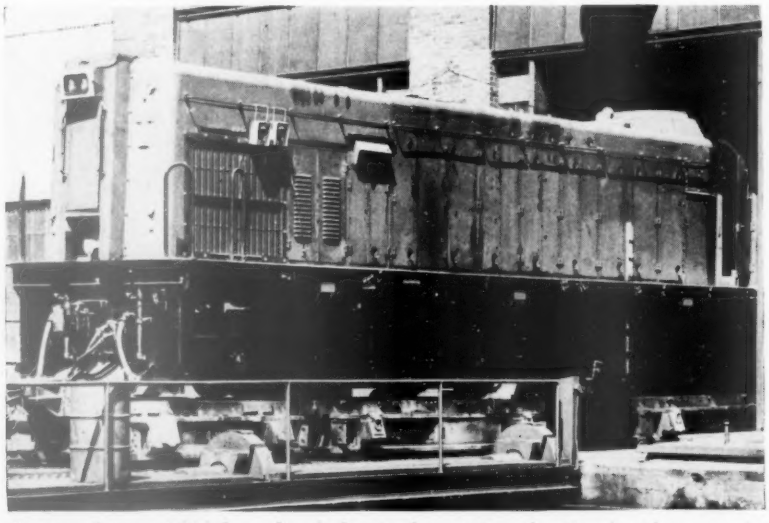
UNITED STATES

Tank Wagons 67 ft. 8 in. Long

The four most capacious tank wagons in the U.S.A. have been built by the Union Tank Car Company and leased to an oil company. Each is 67 ft 8 in. long, 14 ft. 5½ in. high, and 9 ft. 6½ in. wide, and weighs empty 41 tons; the capacity is 22,000 gal., and the load limit is 71 tons, making a total of 1½2 tons. Each of these wagons can do the work of three of normal dimensions, and freight costs are proportionately reduced.

High-Speed Teleprinter Installation

To expedite the classification of more than 50,000 daily reports on wagons in movement, the Illinois Central Railroad has installed a teleprinter which can transmit 600 words a minute, compared with the 60-100 words a minute of teleprinters generally used by U.S.A. railways. Information on the make-up of trains, including wagon numbers, is teletyped from various places and received on perforated tapes in the I.C.RR. communication centre in Chicago. Tapes are then fed into the new teleprinter circuit and reproduced in the Accounting



Universal type 1,980-*h.p. diesel-electric locomotive for South Africa at the International General Electric Company works, Erie, Pennsylvania*

Department office building seven miles away at 600 words a minute. The information is then transferred to punched cards by means of International Business Machines data-processing equipment. Wagon numbers arranged in numerical order pass through a printer which makes a record in page form showing number, identification initials, routing, location, and load of the wagon. The new installation extends at present over about half the Illinois Central system. It is a further step to facilitate answers to inquiries about consignments by railway users. The same information will also be used in the wagon accountant's office.

BRAZIL

C.T.C. Installation

The Central Railway of Brazil has been granted permission to purchase copper cable to the value of Cr. $54,500,000. It will be used for the installation of a C.T.C. system which will enable 80 trains to run in both directions each day between Rio de Janeiro and the State of Minas Gerais.

The Federal Railway Network (R.F.F.S.A.) has itself been authorised to set up a subsidiary company to build and operate a country-wide chain of warehouses, silos, and cold storage plants.

CANADA

Three-Man Train Crews

By agreement with the Brotherhood of Railroad Trainmen, the Quebec, North Shore & Labrador Railroad, is now operating ore trains over its 357-mile line with three-man crews. From the opening of this line, in recent years, no firemen have accompanied the diesel locomotive drivers, but each train has had the customary flagman and a brakeman as well as a conductor. It has now been agreed that on each train a brakeman shall accompany the driver on the locomotive, and that a conductor shall be in the caboose, but that no flagman shall be carried.

As part of the agreement, the trainmen are getting a three-stage increase of pay 10 per cent in two stages retroactive to September 11, 1958, and May 1, 1959, and a third stage of 3 per cent which will become operative on September 11, 1960. The mileage of a basic day has been increased from 100 to 128 miles, or 8 fr. of work, and overtime is paid for on a 16 m.p.h. basis. In various respects the new agreement follows that already concluded between the union and the Canadian Pacific and Canadian National Railways.

ITALY

Second Underground for Rome

A bill, authorising the expenditure of some Lira 25,000 million for the construction of a second underground railway line in Rome, is to be presented to Parliament by the Minister of Transport.

Full details are not yet known, but it is understood that the new line will link Tuscolano and Appio with the other side of the Tiber, the terminus being in the neighbourhood of Piazza Risorgimento and Piazzale Clodio. It will pass through the Termini station, which, in addition to being the principal main-line station for Rome, is also the terminus of the present Metropolitana line linking Rome with Ostia.

To reduce building costs, the tunnels will be constructed near the surface. For this reason, preference is likely to be given to the third rail system rather than overhead cable.

One of the main problems to be faced will be the crossing of the Tiber, because the river bed consists of sand to some considerable depth. It is therefore possible that a bridge may be built instead of a tunnel.

So far as coaches are concerned. preference has been expressed for the four-motored type, with seating for 32 and standing room for 148 passengers.

FRANCE

Bobigny Depot as Diesel Centre

In view of the changeover to diesel traction on a section of the Grande Ceinture Line around Paris, Bobigny, the site of a former steam depot, has been developed as a stabling, fuelling and servicing centre for the 2,000-h.p. diesel-electric main-line locomotives in use on this section, and for the diesel-electric shunting locomotives operating in the area. Facilities available include a 575-ft. four-track siding with two inspection pits and one maintenance pit, tanks for storing diesel fuel and oil, sanding equipment, a water distilling plant, and a plant for supplying treated water for the engine cooling systems.

SWITZERLAND

Lucerne-Engelberg Through Service

The Federal Assembly has ratified the proposal to modernise the Stansstad–Engelberg Railway and link it with the Brünig line of the Federal Railways at Hergiswil. The project includes a mile-long tunnel from Hergiswil to a point near the present road bridge across the narrow entrance to the Alpnachsee, a concrete viaduct, improvements to the permanent way, new electric power plant, and six three-coach electric train sets. Fast trains will complete the journey between Lucerne and Engelberg in 50 min. against 1½-2 hr. it takes now. Three years will be needed to complete the work. The lines concerned are metre gauge.

Publications Received

Soil Mechanics for Railway Engineers.—By Mr. U. G. K. Rao, Joint Director, Research, Railway Testing & Research, Lucknow, India. Obtainable on application to the High Commissioner for India, India House, Aldwych, London, W.C.2. 9½ in. by 5½ in. 206 pp. Illustrated. Price 12s.—This comprehensive work is compiled from lectures delivered by the author, a railway engineer of 20 years' experience. It aims at practical guidance with a minimum of mathematics, and its scope is so wide that few of its features can be mentioned here. From soil geology and sampling, site investigations are described, and engineering tests for soil shear, erosion, and permeability are explained. The author then turns to field work, discussing consolidation, settlement, piling and other foundations. Some of the most important chapters are devoted to embankment and cutting materials and slopes and their protection. Also to retaining walls, slips, slides and foundation failures as well as soil stabilisation. A wide range of subjects is covered by 10 appendices. The illustrations include many graphs and other diagrams, besides a large number of photographs.

Dix Annees d'Activite de la Regie Autonome des Transports Parisiens : (Ten Years' Work of the Paris Transport Board). Reprinted from *La Revue Generale des Chemins der Fer*, May, 1959. 12 in. by 8¼ in. 40 pp. Illustrated.—The present organisation for operating the city transport services in Paris, formed by the bus and Metro routes, came into existence on January 1, 1949, and had the task of carrying to completion an arrangement decided upon in principle in 1942. This reprint, the preface to which is written by the President of the Board, M. Louis Devillers, contains two articles, one by Monsieur G. J. de Cordemoy, covering the operating, the other and longer one by Monsieur C. Lévy, dealing with the technical aspects of development taking place in the last 10 years. Many Metro stations have been rebuilt, trains running on pneumatic tyres introduced, lighting and signalling improved, better arrangements instituted for staff training, etc., while in the case of the bus services like advances have been effected, and new office and other accommodation built. The reprint gives detailed information on every item accompanied by excellent illustrations.

Metal Finishing Services.—A guide to the services offered by the Metal Finishing Division of the Pyrene Co. Ltd., Great West Road, Brentford, Middlesex, and from its provincial depots, has been issued in the form of a 14-page pamphlet. This describes the engineering advice available, with free plant layout drawings, the laboratory corrosion tests carried out on behalf of customers, and the after-sales service to ensure consistently good results by users of the Parkerizing and Bonderizing processes. The pamphlet includes a list of the individual materials available for paint bonding, and rust proofing, together with explanatory notes. Other processes described include coatings to aid cold forming operations and industrial cleaning. There are two pages of illustrations showing typical pre-treatment plants.

XUM

Comfort in Railway Travel

An examination of the fundamentals influencing vehicle design

By R. Mayr

Managing Director, Suisse Industrie Gesellschaft

Werkspoor-SIG diesel-electric Trans-Europ Express luxury train with control trailer leading

INTENSIVE recent developments in the sphere of transport, especially air and road transport, but also on railways, are bringing profound changes in the nature of travel. As far as railway traffic is concerned, we are only at the beginning of a new phase in which comfort is going to be a vital factor. Already it is becoming a focal issue for railways, and, in consequence, one of the main preoccupations of rolling-stock builders, because comfort and safety have become two of the main factors which railways can bring forward in the struggle against air and road transport.

The complex notion of comfort needs systematic analysis, so that the questions and problems involved may be judged by clearly defined criteria, of practical use to the rolling stock designer. Investigations along these lines need to be centred on the human factor; and the relations between human beings, travel, and means of transport should become the subject of a comprehensive research.

Demands on Human Stamina

Recent substantial increases in diesel and electric traction in many countries have been accompanied often by a concentration on speed and safety, comfort playing a secondary part. But today's developments are putting an ever-greater stress on comfort, as exemplified by the Trans-Europ Express trains running in Western Europe. By their high speeds, but no less because of their cultivated standard of comfort, these trains have met with general approval.

Though speed in all spheres of transport will doubtless increase, great efforts are required nowadays to produce what may be only marginal savings in overall travelling time; and the assumption may not be unwarranted that transport speeds, especially those of rail and road, are approaching their maxima. On the other hand, comfort will come to play a more important part, and for two main reasons. First, any further stepping up of transport activities must not lead to further demands on human stamina. On the contrary, it is vitally necessary to reduce such fatigue. Secondly, there has come a profound change in the assessment of the commercial value of travel. In the old days a journey was regarded as reasonably priced if it offered, at the price, a maximum of safety and speed, with the addition of some comfort as an incidental consideration. In contrast, present-day mentality takes it for granted that all possible technical efforts are being made to ensure a maximum of safety.

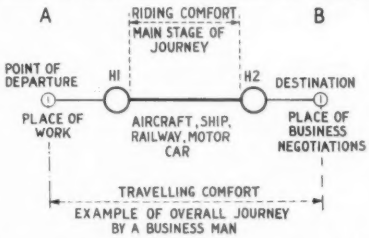


Fig. 1—The different stages of a journey. A to H1 is the preliminary stage, H1 to H2 the main stage, and H2 to B the concluding stage

The emphasis has, therefore, gradually shifted to the demand that the journey must offer, at the price, a minimum of effective overall travel time in conjunction with minimum fatigue.

As shown in Fig. 1, travel may be taken as the journey of an individual from A to B, involving the use of vehicles and consisting of one or more rides on one or several, possibly very different, means of transport. A journey will usually comprise certain walks at the beginning and end, and when changing from one vehicle to another. Generally, a clear distinction can be made between a main stage of the journey and several subsidiary stages prior and subsequent to the main stage. In Fig. 1, the section A —H_1 represents the preliminary stage, H_1—H_2 the main stage, and H_2—B the concluding stage of the journey.

Forms of Travelling Comfort

Comfort may be regarded as the sum total of all those measures which maintain and improve the well-being of a person and reduce his fatigue. The term may be applied not only to passengers but also to the transport staff and to third persons involved in transport. *Travelling comfort* may be said to consist of:

(1) the comfort experienced in the vehicle itself, which may be termed *riding comfort*;

(2) the comfort experienced at stations, air-ports, interchange points, etc., which may here be termed *local comfort*. This is confined, in Fig. 1, to the interchange points H_1 and H_2, and comprises short, dependable and comfortable transfer, clear signs, waiting rooms, facilities for refreshment, etc.;

(3) a further group of factors which have a considerable effect on travelling comfort, such as good connections, frequency of service, reliability in terms of time and place, independence of weather and climate, legal obligation to provide transport facilities, customs clearance, etc. This group may be summed up by the term *organisational comfort*.

The desirable and possible level of comfort will depend on the journey time. A journey of 10 hr. from one capital city to another will require a higher level of riding comfort than a ride of 10 min. in urban traffic. Although there is neither

Table I.—Relative Riding Comfort as a Function of Journey Time

Journey Time	*Comparable Comfort*	*Special Characteristics*
Up to approx. 5 min.	Waiting Room	Relatively good running properties, little noise, good air and good lighting representing a minimum level of comfort. Mainly standing room, good mobility inside the vehicle. Crush-load capacity in peak periods up to, say, 6 persons per sq. metre
Approx. 5 to 30 min.	Furnished Waiting Room	Predominantly or exclusively seating accommodation, but with closely spaced seats. Aesthetic effect on passenger already noticeable
Approx. 30 min. to 2 hr.	Sitting Room	Comfortable seats and resting facilities. The passenger becomes the travelling guest. Some catering facilities for snacks or main meal, according to time of day
Approx. 2 to 7 hr.	Guest House	One or two main meals. Comfortable resting facilities. Reclining seats as a minimum comfort for night journeys. Personal attendance and service. Facilities for work
Approx. 7 to 15 hr.	Residential Hotel	*Day-time :* More exacting requirements in respect of attendance, entertainment and working facilities
	Tourist Hotel	*Night-time :* Full sleeping facilities, with catering for evening meal and breakfast, according to timetable. Particularly smooth running. Individual compartments. (Gliding Hotel)
Over 15 hr.	Holiday Hotel	Comfort of the kind offered in present-day ocean liners. Individual cabins, far-reaching service and entertainment, etc.

an objective measure for the "level of comfort," nor a general classification of the duration of the journey, Table I may help to illustrate the notion of "relative riding comfort."

Requirements in regard to comfort tend to become more exacting in the course of time. What was regarded as the height of luxury 20 years ago is nowadays taken as no more than the normal standard. On the other hand, the classifications used in public transport, such as Luxury Class, First Class, Tourist Class, Economy Class, and so on, are nothing but different degrees of riding comfort translated into different fare levels.

It is apparent from this table and from Table II that a high level of riding comfort, especially during a long journey,

Table II.—Utilisation of a High-Level of Riding Comfort on Long Journeys

Degree of comfort :
High level of riding comfort
Low level of riding comfort
Possibilities for additional utilisation (utility comfort):
For *rest* (regeneration)
For *work* (time utilised)
No scope for additional utilisation (time lost)
Activities :
Total :
Sleeping,
especially on journeys lasting from 7 to 12 hr.
Partial
Relaxation
through rest, observation of landscape, reading, chatting, eating, drinking, sports; mainly in daytime
Work
studying documents ; business conferences ; dictating ; calculating ; writing
Passive Fatigue
occasioned by the journey, especially when travel sickness is experienced
Active Fatigue
Driving a private car or piloting a private aircraft

is not only an agreeable adjunct but may also have a real utility value, inasmuch as the journey time is not merely used for the movement from one place to another, but also, at least partly, for regeneration (mere relaxation or sleep), for meals, or for work (utility comfort).

Why is it that the initiative for a comprehensive investigation of riding comfort has been taken by the builders of railway vehicles? There are several reasons:

(1) With its high degree of uniformity in running (low rates of acceleration), its relatively high indifference to the volume of load carried, its reliability and punctuality, the railborne vehicle offers the best conditions for the realisation of a high level of riding comfort.

(2) No other means of transport, with the exception of a ship, is used over such a wide range of journey times as the railborne vehicle, e.g., a tramway ride of five minutes and an express train run of 16 hr. shows a ratio of approximately 1 in 200, so that the builders of railway rolling stock must cater for the most variegated requirements in respect of riding comfort.

(3) Since cities and industrial centres are directly connected by railways, so that the feeder journeys are relatively short, by far the greatest part of the overall journey time is spent in the railway vehicle. Thus the riding comfort of the railway vehicle assumes special significance.

(4) For some time there has been, especially in long-distance traffic, a clear tendency towards the new conception of self-contained train units in the form of multiple-unit trains consisting of two or more cars, instead of the traditional train consisting of a locomotive and a number of carriages of a composition repeatedly changed *en route*. These new multiple-unit trains call for a higher level of comfort. At the same time they offer quite new possibilities for perfecting travelling comfort. In addition, elimination of shunting movements relieves the track installations and gives rise to a significant reduction in operating costs.

Riding Comfort Analysed

A matter of particular interest is the interplay of the different aspects of riding comfort. In analysing the notion of *riding comfort* it has been found desirable

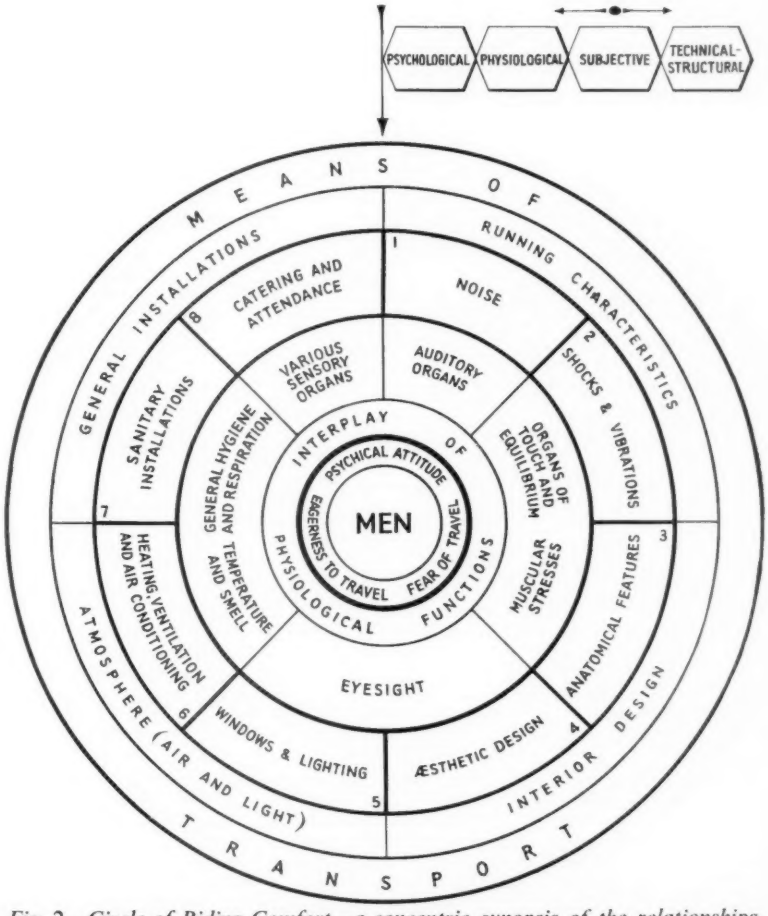


Fig. 2—Circle of Riding Comfort—a concentric synopsis of the relationships between man and vehicle, based on a subjective classification which takes into account the technical/structural aspects on the one hand, and the physiological/psychological aspects on the other hand

to depart from a subjective classification, and to pass on from there to a technical/structural classification on one hand, and to a physiological/psychological classification on the other hand. The circle in Fig. 2, representing the various components of riding comfort, illustrates, concentrically and clearly, the different relationships comprised in the notion of *riding comfort* between a human being (in the centre) and the vehicle (outer ring). The comprehensiveness of this synopsis is due to the fact that it contains, in principle, all the physiological influences acting on the human being, as well as all the technical influences emanating from the vehicle.

The sensory organ registering the acoustic signals (Fig. 2, sector 1), i.e., the ear, is extremely sensitive. Its sensitivity in respect of the volume of energy is akin to that of the eye; but its frequency range is much greater, approximately 1 to 1,000 compared with 1 to 2 in the case of the eye, corresponding to 2^{10}: 2^1, or ten octaves compared with one! But noise also affects the functions of the brain and the vegetative control of the entire organism. Reduction of concentration, brain power, memory and reaction speed; increase of blood pressure, pulse, brain-liquid pressure (liquor-cerebro-spinalis) and muscle tension; reduced activity of the digestive organs—all these phenomena can be traced to the effects of noise, and demonstrate the need for effectively combating noise in general, and noise in vehicles in particular, as shown summarily in Table III.

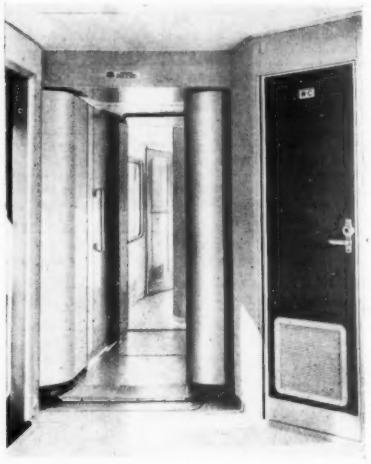
The sensory organs for the "mechanical" effects on man (Fig. 2, sectors 2 and 3),

Table III.—Synopsis of the Predominant Effects of Noise. Physiological Influences of Noise

Effect on auditory organs :
From 70 to 90 Phon onwards : temporary or permanent injury to auditory organs, depending on duration of noise impact.
From 120 Phon onwards : sensation of physical pain
At 130 Phon : the ear drum may be pierced.
Effects on brain functions
Lessening of :
concentration
mental power
memory
speed of reaction
Vegetative control of organism as a whole :
Among the effects are :
increased blood pressure
increased pulse
increased metabolism
reduced activity of digestive organs
increase of brain liquor pressure
increase of muscle tension

viz, the sense of touch, the sense of equilibrium, and the sensation of muscular activity, perceive the forces and accelerations acting on the human body. In this connection, the secondary movements of vehicles, such as starting and braking, rolling, vibrating and shaking, must be regarded as one of the principal causes of the well-known and typical travel sickness. These movements also cause the disturbances which impair, or even preclude, certain activities such as reading, writing, eating, sleeping, and are thus generally highly detrimental to riding comfort. These difficulties can only be overcome by improving the running characteristics by attention to vehicle design (bogies), and to track design and maintenance.

The dynamic stresses are accompanied by static stresses which may, on a long journey, have a considerable effect on the well-being of the passenger. These



Spacious, clean and draught-proof vestibule connection of the Dutch-Swiss TEE trains as designed and built by SIG

stresses can be reduced to a minimum by providing the correct support to the human body, i.e., by seats which are anatomically correct, suitably upholstered, and, if possible, adjustable. Swedish researches have shown that the height of the seat should be such that the passenger is seated on the ischium, and that little or no pressure is exerted on the seat by the thighs. There should also be a slight decline of the seat towards the rear.

In addition, however, the "human proportions" in the widest sense should be taken into account in the design and dimensions of the vehicle. This applies to doors, windows, corridors, entrances, steps, fixed and movable handles, positioning of ashtrays and litter boxes, and other details.

With modern multiple-unit trains, the design of the communication vestibules between adjacent car bodies represents a special problem. By means of a fully-enclosed easily negotiable draught- and dust-proof, well-lit and aesthetically appointed flexible gangway (Fig. 3), reminiscent of a hotel corridor, the passenger should be able to move from one coach to another without hindrance. The train as a whole must be based on a well-thought-out and completely harmonious layout plan.

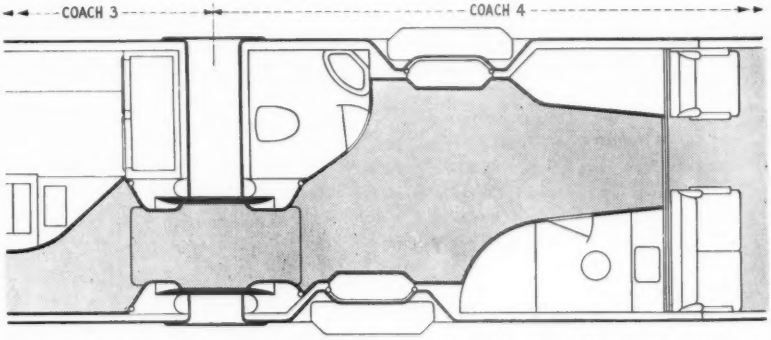


Fig. 3—Plan of the SIG vestibule connection shown in illustration above

In cultured private dwellings and modern hotels, the deliberate use of shape and colour and their harmonious interplay (Fig. 2, sector 4), taking into account the psychological effect on human beings, are nowadays being taken for granted; and a similar tendency can be observed in respect of offices and workshops. Today there can be no doubt that such factors may have a positive influence on the personal well-being, the social behaviour, and the working capacity of a person. The same applies to interiors of vehicles illustrated on the next page. Especially in long-distance travel, the well-being of passengers is influenced by the shape and, particularly, the colour scheme, to a much greater extent than has been generally assumed. It is, therefore, becoming more and more usual, especially with high-class vehicles, to call in experts in interior decoration. According to generally held modern views, the interior should convey an impression of good taste, quality and workmanship. The desired effect of shape and colour on the eye can only be obtained under perfect lighting conditions. But also for the activities concerned, especially reading, a good glare-free lighting is essential. Large and suitably arranged windows, protected by venetian blinds, must admit plenty of daylight and provide the widest possible unobstructed view.

Prerequisites for Health

Light, air and temperature can be regarded as making up the "ambient atmosphere" in a vehicle (Fig. 2, sectors 6 and 7). The technical means used for this purpose are a suitably rationed admission of light, of heated or cooled fresh air, and, if necessary, heat radiation. Correct temperature and humidity, adequate oxygen content, strictly limited CO_2 content, dust-free and odourless air, are the prerequisites for an agreeable and healthy inside atmosphere. It is most necessary to avoid the penetration of smells into the passenger saloons, e.g., from the kitchen, driving mechanism, or toilets. A complete solution of the problem of interior climate can only be obtained by the use of air-conditioning plants, which, again, can only be used if the windows are permanently closed and if the outer doors are not opened too often. With all vehicles wherein the expense of an air-conditioning plant cannot be justified, it is at least necessary

to ensure an adequate supply of fresh air of the correct temperature, for the mere heating of an enclosed and inadequately renewed volume of air cannot create an agreeable atmosphere, at least in large and well-occupied passenger saloons. Care should also be taken that upholstery, paints, varnishes, etc., do not release disagreeable or even noxious aerosols.

As far as the requisite technical installations are concerned, the level of the types of comfort comprised in this last sector of the circle (Fig. 2, sector 8), is governed by what may be called the "general installations" of the vehicle. Physiologically, the sensory organs of vision, hearing, smelling, tasting (dining car) are involved. The importance of this sector, which naturally, in addition to the technical aspect also has a staffing and organisational aspect, grows in proportion to the length of the journey.

Technical Appliances

The manifold technical appliances and premises consist, according to the nature of the requirements, mainly of dining accommodation, modern kitchen, stores rooms, buffet-bar; work rooms with equipment, and, possibly, personnel for secretarial and type-writing work; special rooms for baby-minding (changing of napkins, nursing); observation lounges; luggage depositories; loudspeaker installation with microphone and record player; call system for attendants; telephone, wireless, television. Apart from the often difficult problems of space allocation within limitations imposed by gauge and maximum weight, the vehicle designer will mainly have to pay attention to the "domestic" and "communications" aspects.

Conclusion

We are at the threshold of a new phase of development in which comfort is bound to become an integral factor in public transport, and, therefore, a main preoccupation of the vehicle designer. It is not possible to arrive at an absolute overall evaluation of comfort in the form of a mathematical combination of physical values which could be measured purely objectively. On the other hand, a comparative assessment based on a points system is conceivable and desirable.

The notion of *travelling comfort* encompasses all those measures which, during a complete journey, tend to maintain or improve the well-being of people, and to reduce disturbing influences. Such measures should apply not only to passengers but also to transport staff and to third persons involved. The notion of *riding comfort* comprises the sum total of measures designed to maintain or improve the well-being of passengers during a ride in a vehicle.

Sectors 4, 7 and 8 of the riding comfort circle (Fig. 2) will always be governed largely by fashion and individual tastes, and by the standard and style of living. Sectors 3, 5 and 6, on the other hand, can adhere to more precise rules of general validity, so that it should be possible to arrive at perfect technical solutions. The practical realisation, however, calls for a clear and concrete definition of the task. As far as sectors 1 and 2 are concerned, it must be accepted that it will hardly ever be possible to eliminate completely all the noises and secondary movements affecting a vehicle. It should, however, be possible to reduce the noise to such an extent that it is no longer regarded as a nuisance. Similarly, it should be possible to considerably improve the running characteristics of vehicles and to eliminate unpleasant vibrations and shocks. But with all objectives the economic aspect must not be lost to sight. Any solution aimed at must, therefore, not only be technically feasible but also economically tolerable.

It must be accepted that the layout plans of present-day train units do not conform to an integral layout plan for the train as a whole. Passengers moving between coaches across the bellows gangway are exposed to increased noise, air draught, and often inadequate lighting, so that they feel insecure and ill at ease.

In contrast to today's solution, tomorrow's will have to bring a well thought-out layout plan, consistently designed in accordance with requirements of riding comfort, with unobjectionable near-noiseless aesthetically appointed and absolutely draughtproof gangways, comparable to hotel corridors.

In the farther future, the train may be a "gliding" hotel, with air-conditioned rooms free from traffic noise, and for which the use of the term "gliding" is meant to indicate the excellent running qualities of the vehicles, in conjunction with first-class track, long welded rails, and other improvements.

Swiss Federal Railways lounge car built by SIG, with saloon of distinguished and tasteful appearance enhanced by the aesthetic interior design and the modern style furniture

XUM

Motor Vessel for B.R. Channel Isles Cargo Service

First of two sister ships mainly for the carriage of cattle and containers : twin-screw design with diesel machinery aft

THE diesel-engined twin-screw cargo vessel, mv. *Elk* of 795 tons gross, owned by British Railways, Southern Region, is in regular operation on the Southampton — Weymouth — Channel Isles routes. It was built by Brooke Marine Limited, Lowestoft, to comply in all respects with Ministry of Transport regulations for a Class VIII ship and under survey by Lloyds for Special Class + 100A1. for Channel Service.

Brief details and the naming by Lady Warter, wife of Sir Philip Warter, Chairman of the Southern Area Board of British Transport Commission, were recorded in our August 28 issue.

This vessel and its sister ship, *Moose*, from the same yard, replace three coal-burning reciprocating-engined vessels, the *Whitstable*, *Hazlemere*, and *Ringwood*, built in 1925-1926.

The *Elk* and the *Moose* are of the open shelter deck type with machinery aft and are designed for the carriage of containers, general cargo, perishable foodstuffs, and cattle. Except for the deck-to-shell construction, riveted for half length amidships, the hull is of welded construction.

The principal particulars are:

	ft.	in.
Length overall	228	0
Breadth moulded	38	6
Draught loaded	13	4⅝
Deadweight	870 ton	
Gross tonnage	794.55 ton	
Cargo capacity (bale)	72,774 cu. ft.	
Speed	14 knot	

Special attention has been given to ventilation of the holds and 'tween deck spaces by a Thermotank supply and exhaust system. Heating is by hot-water radiators supplied from an Ideal Britannia oil-fired boiler. The large size of the hatches allows the maximum number of containers to be lowered and stowed direct by crane. The design of the cargo spaces also provides for extensive use in them of fork lift trucks and other mechanical handling devices. Portable stalls to Ministry of Agriculture approval are provided for 85 cattle. There is a Drysdale sludge ejector system for use when carrying cattle.

Accommodation for Officers and Crew, including galley and mess room is on poop and upper decks aft. All lining and divisional cabin bulkheads are fire resistant Marinite with Warerite plastic facings.

Two 900-b.h.p. Main Engines

The main machinery of the *Elk* consists of two Swiss-manufactured Sulzer 6TD36 single-acting trunk-piston two-stroke marine diesel engines each rated at 900 b.h.p. at 250 r.p.m. The engines are fresh-water cooled with electrically-driven Hamworthy fresh-water pumps. Circulation of sea water through the Serck heat exchangers is by engine-driven pumps.

The shafting and sterngear was supplied by F. Bamford & Co. Ltd. The tail-shafts run in whitemetal bearings, oil lubricated by the Vickers Vista system and bearings for the intermediate shafts are Cooper split roller type. Propellers, supplied by J. Stone & Co. (Charlton) Ltd., are four-bladed in Novoston alloy.

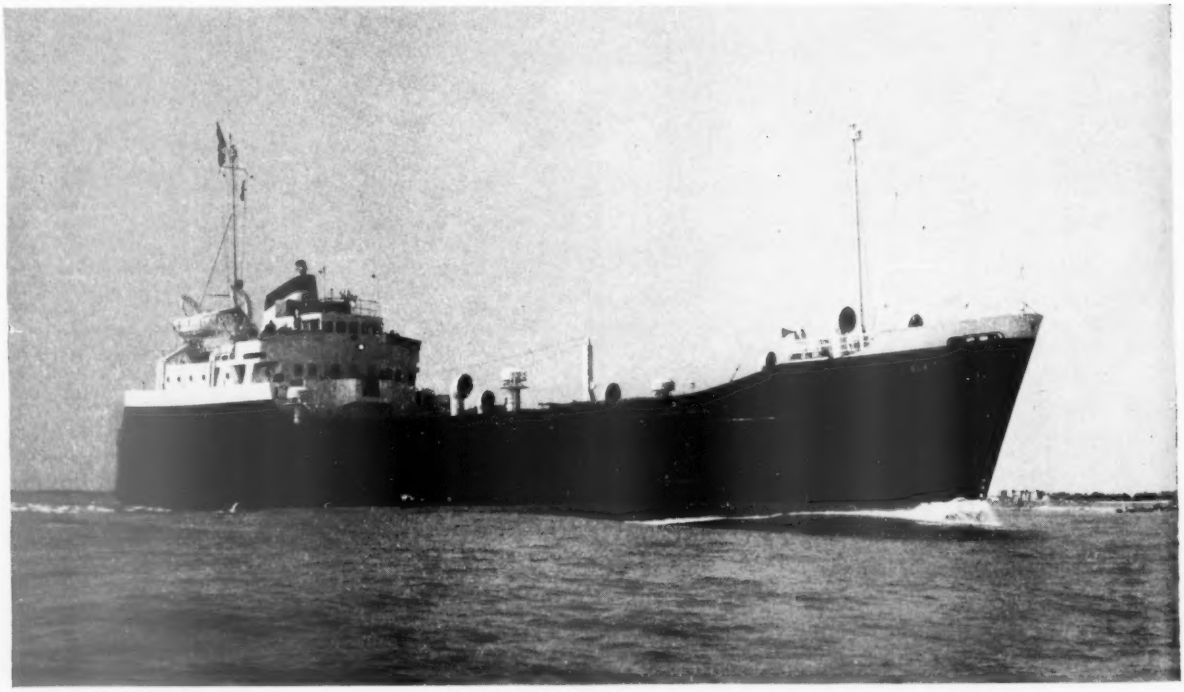
Electric current at 225 V. d.c. for lighting and power, is by three 80-kW. Mawdsley generators driven by Ruston type RPHZ four-cylinder V-form diesel engines each rated at 133 h.p. at 1,000 r.p.m. One 15-kW. set of similar make is provided for emergency use and harbour duties. A Hamworthy two-stage air compressor of 9.2 cu. ft. per min. capacity can be clutch-driven from the emergency generator engine.

The main starting air supply at 425 lb. per sq. in. is provided by two 75 cu. ft. air receivers, charged by two Hamworthy electrically-driven compressors. Two 5 cu. ft. receivers provide air to whistle, workshop, hose connection, and to sea inlets for weed-clearing purposes, as well as starting air to the generator engines.

Emergency and priming lubrication of main engines and fuel oil transfer are by Hamworthy triple-screw pumps. There are two Sharples Super Centrifuges, one for lubricating-oil purification and the other for fuel oil; both are electrically heated.

There are two main-engine-driven bilge pumps each of 32 tons per hr. capacity, and two independent motor-driven Hamworthy centrifugal pumps for bilge, ballast, general service, and stand-by

(*Continued on page* 271)



The mv. " Elk " built by Brooke Marine Limited for British Railways, Southern Region, on sea trials before handing over

200-ton Locomotive Traverser at Crewe Works, L.M. Region

Primarily for transporting electric locomotives; electro-hydraulic variable-speed drive

A TRAVERSER capable of transporting locomotives of up to 200 tons recently has been installed in Crewe Works, British Railways, London Midland Region. It was manufactured to a specification of British Railways by John Boyd & Co. (Engineers) Ltd. of Annan, Dumfriesshire. Primarily it will deal with the electric locomotives to be built at Crewe, and it will give a means of access to the repair bays of the electric locomotive repair shop now being erected.

The traverser is in a pit 90 ft. 2 in. wide and 530 ft. long, and is borne on 11 rails set at 8 ft. 8 in. centres with their running surface 2 ft. 6⅞ in. below yard rail level. The unloaded weight is 67 tons. The table is 90 ft. long by 16 ft. 6¼ in. wide, and has one standard-gauge rail track with a pair of spring-loaded rail boxes at each end to reduce shock loading on the traverser while a locomotive is moving on or off the table. A driving cabin is provided at each end.

Box-Girder Construction

The table is carried on 11 box girders, each containing two cast-steel flanged travelling wheels 2 ft. diameter. A driving shaft throughout the whole length of the table gears direct on to six trailing travel wheels.

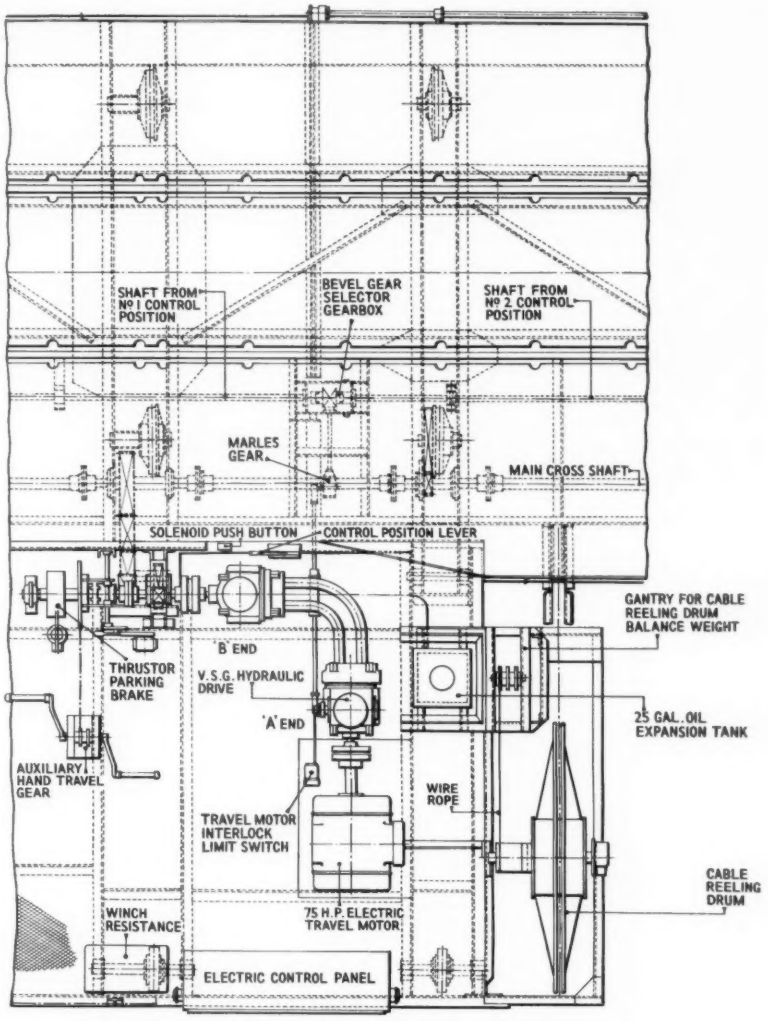
A separate driving platform in the centre of the trailing side of the main traverser table is carried on three flangeless trailing wheels and is articulated with the main table. It carries the main driving mechanism, a haulage winch, winch driving cabin, electrical equipment, and travel limit switches.

Hydraulic Variable-Speed Gear

The traverser main drive is by a 70 h.p. constant-speed electric motor driving through a V.S.G. hydraulic variable-speed gear. This gives operational speeds up to 150 ft. per min. including creeping speeds for the purpose of positioning the traverser at the various running-on tracks. Hand-propelling equipment may be used in the event of power failure.

Movement is controlled from either driving cabin by the operation of a hand-wheel, and the control handwheel in the cabin not being used is isolated. There are duplicate parking brake levers. A winch hauls locomotives on to or off the table by means of a wire rope and fair-leads situated at both ends. This is electrically-driven by a 25 h.p. motor and is capable of hauling the heaviest locomotive at a maximum speed of 150 ft. per min.

Current collection is by a counter-weight-operated cable reeling drum also mounted on the central platform, the cable being connected to the mains supply by a swivelling plug and socket fixed in a ground box midway along the traverser pit. The electricity supply is 415V. three-phase, 50-cycles.



Details of V.S.G. hydraulic drive and gearing (plan view)

Motor Vessel for B.R. Channel Isles Cargo Service

(*Concluded from page* 270)

salt-water main-engine cooling duties. Domestic fresh water and sanitary water supplies are maintained by Mono pumps. Windows throughout the vessel are manufactured by Beckett, Laycock & Watkinson Limited and round side-lights are of John Roby Limited supply.

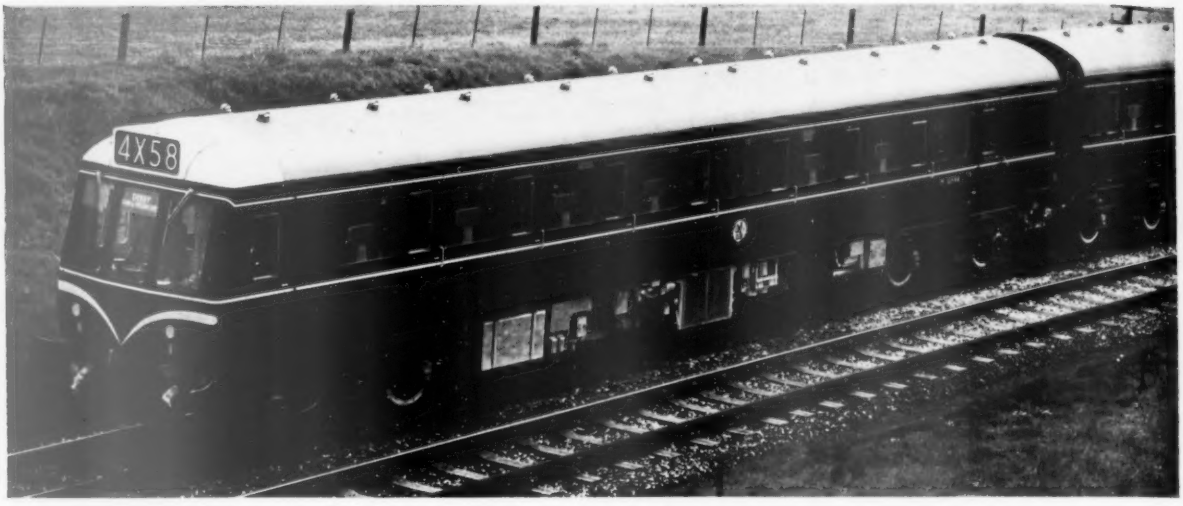
An efficient alarm system includes "wrong way" alarms incorporated in the engine room telegraphs and equipment to protect the main and generator engines in case of cooling water or lubricating oil failure. All alarms give audible and visible warning at the central control position.

Navigational aids and equipment fitted in the wheelhouse and chart-room include Decca radar and navigator, Marconi radio telephony, Pye V.H.F., Subsig echo sounder and Chernikeef electric log. Docking and emergency steering telegraphs are Siemens electric type; engine telegraphs Chadburns mechanical type. Kent clear view screens are fitted in the wheelhouse front outboard windows.

Two reversible 24-in. fans each capable of supplying 7,750 cu. ft. per min. are installed for engine room ventilation. The switchboard by Whipp & Bourne Limited is the live-front type with single-stage preferential tripping. A 24-V. battery system by Clifford & Snell Limited automatically provides emergency lighting for the engine room.

London—Bedford Multiple-Unit Diesel Trains

Torque-converter transmission with Rolls-Royce engines in four-car sets built at Derby



A motor car at rear of four-car train on a test run. Note four-digit route indicator, and speedometer generator on non-driving axle

ROLLING stock consisting of 30 four-car diesel sets for the modernised St. Pancras—Bedford suburban service of British Railways, London Midland Region, is being built at Derby Works, L.M. Region, to a design which includes Rolls-Royce engines and Rolls-Royce/Twin Disc torque-converter transmission units.

Although, as recorded in our last week's issue, the diesel service was inaugurated on September 28, it is supplemented by steam working and timings will remain unaltered until January 3, 1960. Preliminary details of the accelerated all-diesel service beginning on January 4, and of the alterations to stations and track were given in our June 5, 1959, issue.

Sets of Up to 12 Cars

Each four-car set consists of a motor brake open second, trailer lavatory second, trailer second, and a motor brake open second. They are capable of being run with eight or twelve cars by coupling together two or three sets.

Leading particulars are as follow :

	ft.	in.
Length over headstocks	63	5
Width over body panels	9	0
Height–rail to top of roof	12	4½
Centres of bogies	46	6
Bogie wheelbase	8	6
Wheel dia.	3	0

Tare weight (estimated)	Ton	cwt.
Motor car	39	10
Trailer	28	10

Each motor car is powered by two Rolls-Royce C8N normally aspirated direct-injection horizontal oil engines with eight cylinders of 5⅛-in. bore and 6-in. stroke. Maximum power is 238 b.h.p. at 1,880 r.p.m. giving a total of 952 b.h.p. and a power/weight ratio of 7 to 1 for a four-car set. Engines and torque converters in unit construction are slung below floor level on Metalastik flexible mountings and each unit drives one inner axle.

The body and roof framing are of conventional B.R. design in steel of "top hat" section ⅛-in. thick, with bodyside and roof panelling of 16 s.w.g. steel sheet. The driving compartment canopies are of moulded polyester glass laminate and incorporate four-digit route indicators, making these the first B.R. vehicles to be so equipped. The floor consists of ¾-in. thick blockboard with ¼-in. thick asbestos insulation sheet and a 16-s.w.g. light alloy panel on the underside. The interior of the bodyside, body ends, and roof space is filled with glass-fibre as a means of insulation for heat and sound.

The interior finish is of plastic panelling in matt yellow, charcoal, and buff. Wood mouldings are of mahogany, polished in the natural colour. Ceiling panels are also plastic in ivory matt and floors are covered with linoleum of gunmetal marble finish.

Accommodation in a four-car unit is

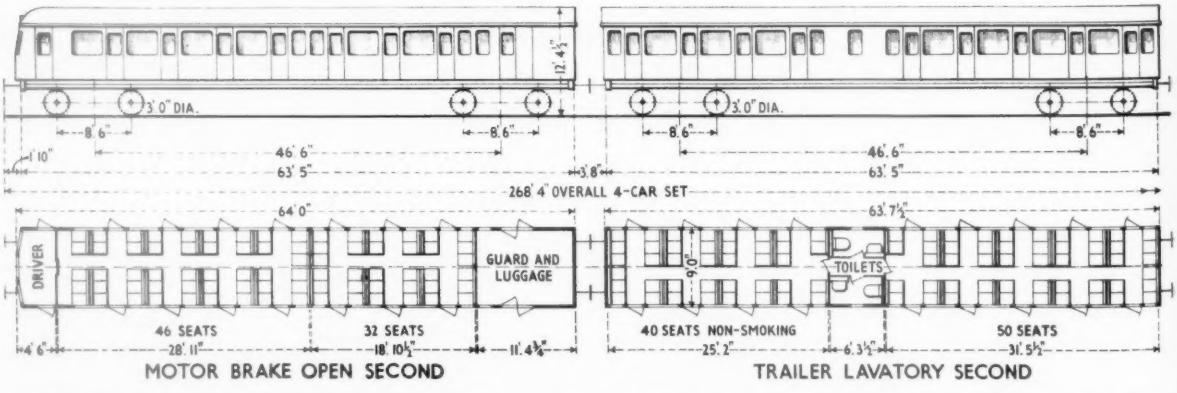


Diagram of motor brake open second and trailer lavatory second vehicles showing general arrangement and seating plan

in semi-open compartments for 352 second class passengers. Seats are non-reversible, mainly of the back-to-back type. They are on steel tubular framing. Seat covering is of cut moquette, with horizontal stripes in tan, yellow, and black. The seat ends are enclosed with a solid timber frame faced with a semi-matt green plastic panel.

Heating is by means of two Smiths thermostatically controlled oil-burning combustion heaters mounted on the underframe. Fresh air is drawn in through a filter and heated after which it passes through a system of ducts under the floor with outlets into the car.

The exterior is painted bright green with cream plumes on the front of the driving compartments to act as a visual warning to staff working on the line. Roofs are painted grey.

The underframe is of mild-steel welded construction, 63 ft. 5 in. long over headstocks. The solebars are 7 in. x 3½ in. channel section, and the main longitudinals are 10¾-in. deep, of welded angle and plate. The side buffers are of the self-contained type with rubber springs and the drawgear of the central screw-coupling type with rubber springs situated behind the underframe bolster.

Conventionally designed bogies in mild steel have individual members partly fabricated and the main framing members are riveted together. The centre castings and side friction castings are carried on resilient rubber mountings and the bolsters have Armstrong hydraulic dampers. Timken taper-roller bearings are used throughout.

A Gresham & Craven A.I.V. quick-release vacuum brake system is used in conjunction with engine-driven Clayton Dewandre exhausters.

Direct Drive Above 46 m.p.h.

The engines are built at the Sentinel Works, Shrewsbury, of the Rolls-Royce Oil Engine Division and they incorporate a C.A.V. hydraulic governor mounted on the fuel pump, A special feature of the Crewe-built three-stage torque converter is that the transmission is changed to direct drive at 46 m.p.h. For this purpose the engine is throttled down for 4 sec. automatically and the clutch incorporated in the torque-converter casing is engaged by means of a Smith-Stone electro-pneumatic control system incorporating Westinghouse e.p. valves and working on voltage-sensitive relays fed by the axle-driven speedometer generator.

When the train speed falls to about 39 m.p.h.there is an automatic change out of direct drive back to torque-converter drive without de-throttling the engine. Under this condition the free wheel prevents shock loading of the transmission.

Interior of semi-open second class compartment showing high density seating and fluorescent lights

The torque converter gives a torque ratio equivalent to 5: 1 at stall and this decreases as tractive resistance drops. The absence of gear changing means that there is no interruption of effort during acceleration to 46 m.p.h. The direct drive above that speed, up to the nominal maximum of 70 m.p.h., gives maximum efficiency. The transmission fluid is fuel oil fed by an engine-driven charge pump and returned to the 95-gal. fuel tank after passing through a heat exchanger.

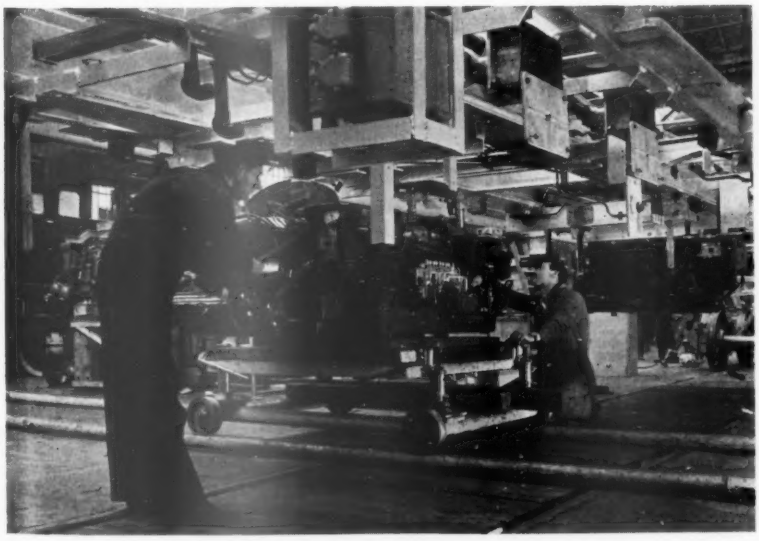
Automatic Features

A reversing gear is incorporated in the 2.97: 1-ratio S.C.G. RF28 final-drive axle. When the vehicle is stationary, if the selector dogs become butted to hinder engagement during the selection of a change of direction of motion, an automatic device signals the torque-converter control to cause slow rotation of the cardan shaft. Neutral gear can be selected in cases such as the automatic coolant and lubrication fault-protection gear having shut down the individual engine. This requires a local manual control to be operated by the driver.

In each driving compartment there are " engine running " (oil pressure) indicator lights for 12 engines (six motor cars), air pressure indicator lights for six motor cars, two engine-starting buttons (one for the engines down each side of the train), one engine-stop button, a guard-to-driver signalling buzzer, a telephone for communication between driver and guard, and a fire bell which functions in conjunction with an automatic extinguishing and engine-stopping system.

On the driver's control desk are an electric speedometer, air pressure gauge, duplex vacuum gauge, switches for controlling demister and route and destination indicator panel lights, dimmer switch for the panel lights, horn control, and windscreen wiper control. Also there is a key-operated main battery switch.

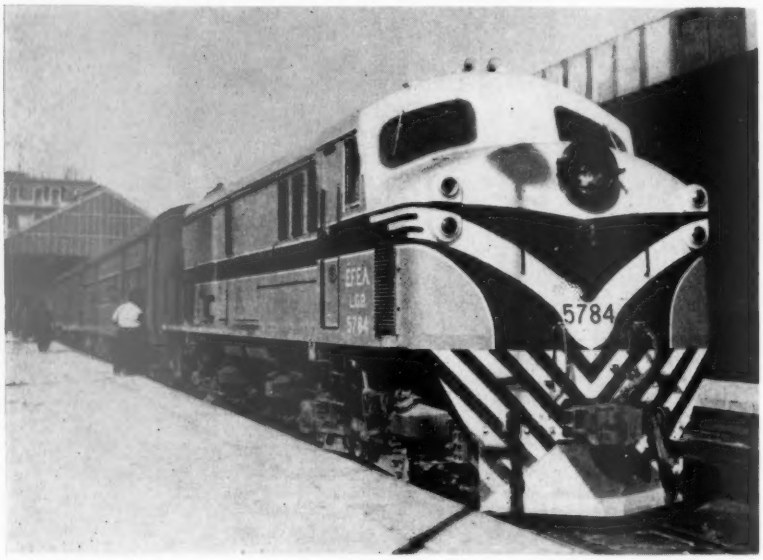
(*Continued on page* 276)



One of the Rolls-Royce C8N 238-h.p. power units being fitted to the vehicle underframe at Derby Works, London Midland Region

British Diesel-Electric Locomotives for Argentina

Nominal power of 1,000 h.p. in English Electric A1A-A1A single-cab mixed-traffic design



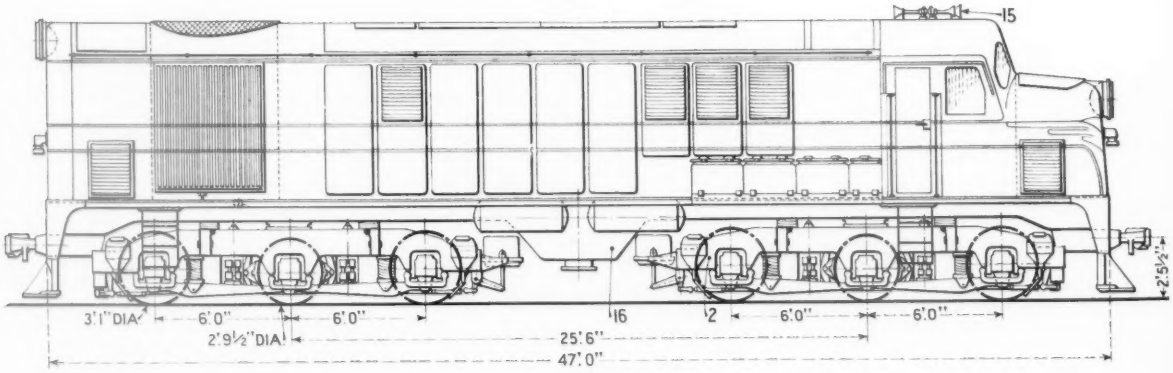
One of the 21 1,000 h.p. English Electric locomotives heading Argentina State Railways passenger train in Buenos Aires

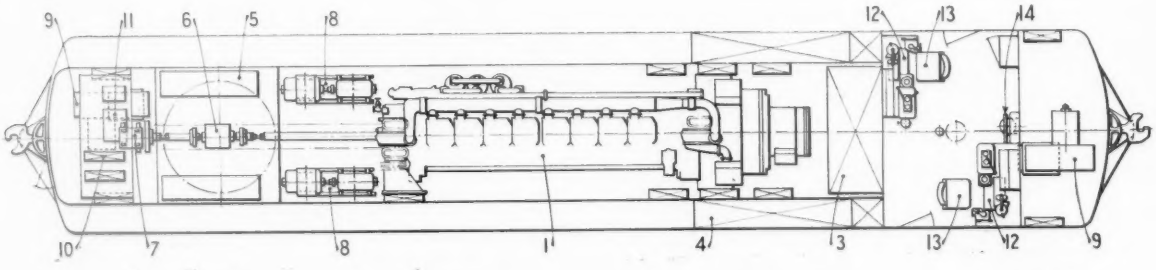
RECENT additions to the expanding fleet of diesel locomotives on the Argentine State Railways are 21 metre-gauge A1A–A1A 1,000-h.p. mixed-traffic units, from the English Electric Co. Ltd., now entering service on the General Belgrano Railway. They are generally similar to five units ordered by the Buenos Aires Provincial Railway in 1956. Power and transmission components are manufactured at the Preston works of the English Electric Co. Ltd., and mechanical parts are products of Vulcan Foundry Limited and Robert Stephenson and Hawthorns Limited, both members of the English Electric Group. All the locomotives have been shipped to their destination.

Principal dimensions and data are as follow :—

Weight in working order	73 ton	
Maximum axleload	13 ton	
	ft.	in.
Length over headstocks	47	0
Overall width	8	10
Overall height	12	3
Total wheelbase	37	6
Wheel dia. (motored)	3	1
Wheel dia. (unmotored)	2	9½
Fuel capacity	539 gal.	
Gear ratio	68/15	
Starting tractive effort (30 per cent adhesion)	35,000 lb.	
Continuous tractive effort at 11.5 m.p.h.	22,710 lb.	
Maximum service speed	50 m.p.h.	

In each locomotive the English Electric 8 SRKT engine, with its main and auxiliary generators, forms one flexibly-mounted unit. The four-stroke pressure-charged in-line engine with eight 10 x 12-in. cylinders is rated normally at 1,000 h.p. at 850 r.p.m., but to meet the conditions of high temperature and humidity it is derated to 940 b.h.p. at that speed. For the derated power the





1 Engine with generator
2 Traction motors (4)
3 Control cubicle
Batteries
5 Radiator panels
6 Radiator fan drive
7 Compressor
8 Exhausters (2)
9 Blowers (2) for traction motor
10 Resistances
11 Voltage and torque regulators
12 Driver's controls
13 Driver's seat
14 Parking brake
15 Warning horns
16 Fuel tank

Diagram showing principal dimensions and plan layout of interior

brake mean effective pressure is 116 lb. per sq. in. Fuel consumption at 100, 75 and 50 per cent loads averages 0·392, 0·383, and 0·391 lb. per b.h.p.-hr., respectively, based on fuel with a mean calorific value of 19,750 B.T.U. per lb. Pressure charging is by means of two Napier exhaust-gas turbo-chargers.

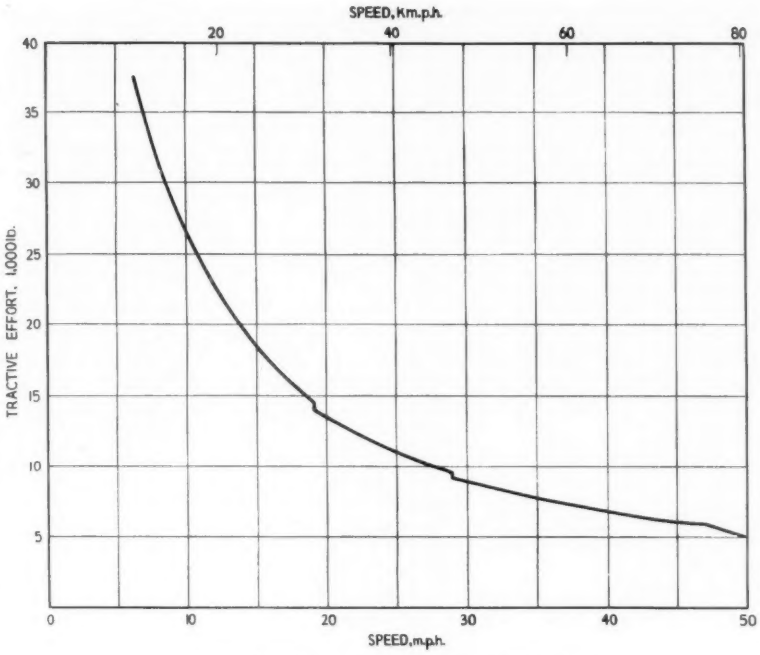
Forced Lubrication

A water-circulating pump and two lubricating-oil pumps are driven from the free end of the engine crankshaft. One of the lubricant pumps circulates oil from the engine sump through oil radiators; the other delivers oil through filters to the crankshaft main bearings, and thence through drillings to the connecting rod big ends and gudgeon-pin bearings. Forced lubrication is provided also to camshaft bearings, camshaft and pump drives, and valve gear. The governor is driven from the camshaft at the flywheel end of the engine.

Protective shut-down features for the engine include overspeed and low lubricating-oil pressure trips; the engine is automatically shut down also in the event of the water level falling below a pre-determined point in the cooling system. In addition, a warning light at each driving position changes from dim to bright in the event of excessively high water temperature.

Electric Transmission

The six-pole main traction generator is a self-ventilated single-bearing d.c. machine, the non-driving end of which carries the overhung auxiliary generator. The main generator has a separately-excited field winding and a series winding to enable it to act as a series motor for cranking the engine. The shunt-wound auxiliary generator, controlled by an automatic voltage regulator, supplies current at 110 V. for the excitation of the main generator field-control circuits, blower motors, locomotive lighting, and charging for the nickel-cadmium-alkaline battery.



Curve showing tractive effort at wheel rims

Two nose-suspended traction motors are mounted on the outer axles of each bogie. They are series-wound six-pole forced-ventilated machines. Two stages of automatic field weakening are provided by diverter resistances to enable constant wheel-tread horsepower to be obtained throughout the required speed range. The traction motors are permanently connected in two parallel groups each consisting of two motors in series.

Two Cooling Blowers

Two motor-driven blowers, mounted at the ends of the locomotive, each supply cooling air to traction motors on the adjacent bogie. The air compressor, which has a swept volume of 117·8 cu. ft. per min. at 750 r.p.m. is mounted in the rear-end compartment and engine-driven through the gearbox of the radiator fan. It supplies air for operating control gear, warning horns, sanding equipment, and locomotive and train brakes.

Radiator panels mounted on both sides of the locomotives each have oil and water elements. A roof-mounted fan draws air over the radiator elements and ventilates the engine compartment by expelling air through the roof. This fan is mechanically driven through a centrifugal clutch and gearbox from the engine crankshaft. All air supplied to the diesel engine, turbo-charger inlets, traction motors, and auxiliary machines is drawn into ducting through oil-wetted filters.

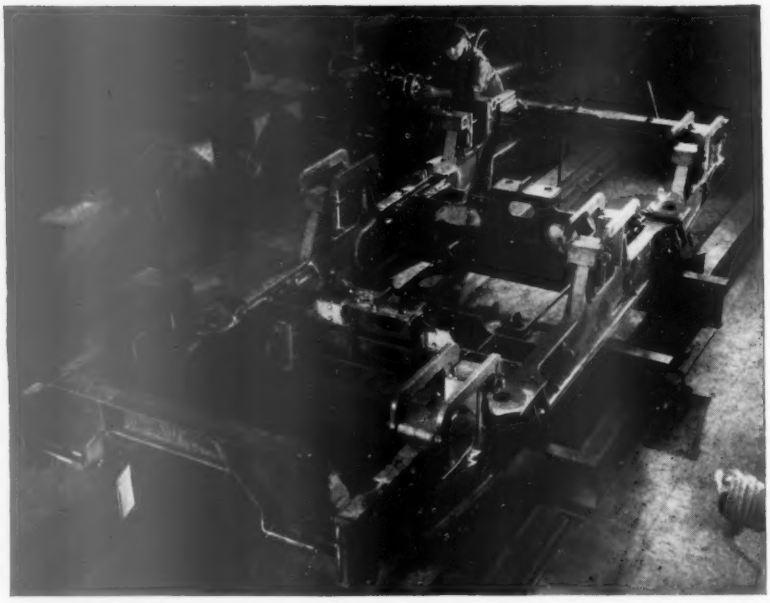
Controls Duplicated

Most of the control equipment is housed in a cubicle mounted against the bulkhead between the driving cab and the engine compartment. This frame contains the electro-pneumatic contactors and reverser together with associated relays. At each driving position in the single cab, a master switch, control handle, and brake valve are provided together with an instrument panel and indicator lights.

The engine is started by moving the master switch to the "engine only" position, and pressing the starting button. In this controller position the

Final painting of one of the locomotives for Argentina. The complete power units for two further locomotives also are shown

XUM



One of the bogies inverted for drilling and reaming at the Darlington works of Robert Stephenson & Hawthorns Limited

engine can be run at varying speeds by moving the control handle while the locomotive remains stationary. To move the locomotive the master switch is moved from the "engine only" position to the appropriate direction of motion.

Initial movement of the control handle causes the reverser to be moved to the pre-selected position and the motor contactors to close. At the same time a small current is fed to the main generator field, thereby providing sufficient tractive effort to manœuvre the locomotive at the very low speeds required during coupling up. Further movement of the control handle results in increased power being supplied to the traction motors by increasing the main generator field strength and the engine speed.

Load Control

To obtain full utilisation of the power over a wide range of speed and tractive effort when the control handle is moved to the final position, and to prevent the engine being overloaded by errors in driving, an automatic loading device is incorporated in the control equipment. The load regulator also initiates the field diversion of the traction motors in stages at appropriate speeds, thus spreading the range of locomotive speeds over which the full engine horsepower is available. Up to three locomotives may be coupled together and driven in multiple from one cab.

The locomotives are fitted with four additional safety devices. These are: a key for the controllers to prevent unauthorised use; a deadman device; a pressure switch in the compressed-air system to prevent the locomotive being moved under power until sufficient air pressure has been built up for braking and control purposes; warning lights which indicate failure of traction-motor blowers, wheel slip, and satisfactory running of the engines of other locomotives when in multiple-unit operation.

Welded Construction

The underframe of the locomotive is of fabricated construction. Main longitudinal members of the truss type extend for the full length and are deepened towards the centre to form the sides of the fuel tank. The superstructure is fabricated as a unit, welded to the underframe, and divided into five compartments separated by bulkheads. Behind the nose compartment is the full-width cab in which there are driving positions for each direction of travel. Next come the engine room, radiator compartment, and compressor compartment. Removable roof sections and hinged roof hatches give easy access for maintenance.

The three-axle bogies are of the swing-bolster type with robust frames of fabricated construction. The bogie frame is carried on four nests of coil springs which rest on axlebox under-slung equalising beams. The position of the coil springs is so arranged that the static axleloads are equalised. Load from the locomotive superstructure is transferred to the bogie frame through a fabricated bolster to four laminated spring groups. Two of these groups rest on each spring plant which is suspended from the bogie transoms by inclined swing links. Lateral movement of the bolster is limited by stops. Bogie centre pivots fitted to the underframe engage with the pivot centre on each bolster.

Road wheels and traction-motor gear wheels are pressed on to the axles and the axleboxes are of the roller-bearing type. There are four brake cylinders to a bogie, one cylinder for each motored wheel. A handbrake for parking purposes operates on the front bogie.

The locomotives are being used in the Argentine mainly on the suburban services between Buenos Aires (Retiro Station) and Bel Viso, a distance of 44 km., hauling passenger trains averaging 300 tons, made up of seven—eight carriages. Depending on the diagram, some of the locomotives can cover 500 km. every 24 hr. One particular shift allows 20 min. for fuelling every 24 hr. so that the locomotive is in service for 23 hr. 40 min. each day.

The units are also used in main-line service north of Rosario and to work fast goods trains, double-headed, between Buenos Aires and Rosario, hauling 1,600 tons. The maximum tonnage hauled by a single unit is limited to 800 tons to ensure that trains conform with the high-speed requirements of the railway.

London—Bedford Multiple-Unit Diesel Trains

(*Concluded from page* 273)

The units can work in multiple with cars fitted with conventional four-speed gearboxes. For this reason the speedometer is calibrated to indicate when gear changing is advisable and the drive selector lever at the driver's right side is marked "D, 3, 2, 1." Above is the mechanically-interlocked reverser controller and on the driver's left is the engine speed controller which has five positions and incorporates the deadman handle. The parking handbrake control wheel is midway across the cab.

The free wheel ensures the mutual independence of the engines and ease of control is aided further by the automatic isolation of starter circuits on engines which are running.

Fluorescent lighting tubes along the centre of each coach roof interior are supplied at 240 V. 1,000 /1,665 cycles a.c. from individual 40 W. A.E.I. transistor oscillators fed at 24 V. d.c. from the 440 Ah. lead-acid battery carried below the underframe. Battery charging generators are engine-driven on motor cars and axle-driven on trailers. Inter-car connection is by 19-core p.c.p. sheathed cables with 19-way plugs for which sockets are provided at the corners of each car.

Principal sub-contractors include:—

Engines and torque converters	Rolls-Royce Limited
Fuel pump/governor	C.A.V. Limited
Automatic controller	Smiths Industrial Instruments Limited
Flexible mountings	Metalastik Limited
Compressors and e.p. valves	Westinghouse Brake & Signal Co. Ltd.
Exhausters	Clayton Dewandre Co. Ltd.
Vacuum brakes	Gresham & Craven Limited
Final drive and reverse gear	Self Changing Gears Limited
Buffers	Garringtons Limited.
Rubber springs for buffers	George Spencer Moulton & Co. Ltd.
Rubber springs for draw-gear	Clyde Rubber Works Co. Ltd.
Bogie bolster control shock absorbers	Armstrong Patents Limited
Doors	Lightalloys Limited
Windows	Beckett, Laycock & Watkinson Limited
Lighting	A.E.I. Lamp & Lighting Co. Ltd.
Heaters	S. Smith & Sons (England) Ltd.
Fire protection equipment	Graviner Manufacturing Co. Ltd.
Taper-roller bearings	British Timken Limited
Generators	J. Stone & Co. (Deptford) Ltd.

RAILWAY NEWS SECTION

PERSONAL

Mr. C. T. Venugopal, Director Finance, Indian Railway Board, has been appointed Additional Member, Finance. He succeeds Mr. Apjit Singh.

Mr. C. H. Brazier, Director of Industrial Relations, Manpower Advisers's Department, British Transport Commission, who, as recorded in our August 28 issue, has retired, was educated at Exeter Episcopal School and joined the old London & South Western Railway, in 1913, as a junior clerk. After station experience he was transferred to the London West Divisional Superintendent's Office. He served in the Railway Operating Division, Royal Engineers, during the 1914-18 war. From 1928 to 1936 he was Outdoor Staff Investigator, attached to the Headquarters of the Traffic Department, Southern Railway, relinquishing that position on appointment as Staff Assistant to the Docks & Marine Manager, Southampton. In January, 1940, he was appointed Outdoor Superintendent, Southampton Docks, and in 1941 returned to the Traffic Department. In 1942 he became Staff Assistant to the Traffic Manager. On nationalisation of the railways, Mr. Brazier was appointed Wages Staff Assistant to the Chief Officer (Staff & Establishment) at Railway Executive Headquarters. In 1950 he was promoted to be Regional Staff Officer, Scottish Region, Glasgow, and in 1956 became Director of Industrial Relations, Manpower Adviser's Department, B.T.C. Headquarters. In this capacity Mr. Brazier represented the Commission in important national negotiations on the wages and conditions of service of British Railways staff. He acted as Chairman of the Railway Staff Conference, the British Railways Joint Advisory Council for Welfare, and the British Railways Headquarters Committee on First Aid Matters. He was also Chairman of the management side of various national negotiating bodies, including the Railway Shopmen's National Council and the British Transport Police Force Conference.

Mr. C. H. Brazier
Director of Industrial Relations, B.T.C., 1956-59

Mr. C. S. McLeod
Appointed Director of Industrial Relations, B.T.C.

Sir Ian Bolton, Chairman, Scottish Area Board, British Transport Commission, retired on September 30, when the period of his appointment as a Member of the Commission ended. He has been succeeded as Chairman, Scottish Area Board, by Mr. D. H. Cameron of Lochiel. Sir Francis Glyn, on medical advice, also retired on September 30, from the London Midland Area Board. Maj.-General G. N. Russell has been appointed a member of that Board and will relinquish his present membership of the Eastern Area Board.

Mr. David Blee, General Manager, London Midland Region, British Railways, and Mr. H. Leslie Bowes, Managing Director, Royal Mail Lines Limited, and the Pacific Steam Navigation Company, who finished their terms of office as Vice-Presidents of the Institute of Transport on September 30, have been elected Ordinary Members of Council. They fill vacancies caused by the election of Mr. F. C. Asgill, as Hon. Treasurer and Mr. H. H. Crow as a Vice-President.

Mr. M. N. Chakravarty has relinquished his appointment as Member (Staff), Indian Railway Board.

Mr. C. S. McLeod, M.Inst.T., Regional Establishment & Staff Officer, Eastern Region, British Railways, who, as recorded in our August 28 issue, has been appointed Director of Industrial Relations, in the Manpower Adviser's Department, British Transport Commission, joined the London & North Eastern Railway as a Traffic Apprentice, in 1927. After the normal training and subsequent experience in staff work in the Chief General Manager's Office, he was appointed Assistant to the District Goods & Passenger Manager, Dundee, in 1935, and Assistant to the Goods Manager, Glasgow, in 1938. Later he became Assistant Goods Manager, Scottish Area, L.N.E.R., and during the 1939-45 war acted as Goods Manager of the Scottish Area. In 1945 he was appointed Assistant Divisional General Manager of the Scottish Area at Edinburgh, and in 1947 became Principal Assistant (Staff) in the Office of the Chief General Manager. On nationalisation of the railways, Mr. McLeod was appointed Assistant Regional Staff Officer, Eastern Region, and was promoted in 1951 to be Regional Establishment & Staff Officer.

We regret to record the death on September 18, at the age of 67, of Mr. W. T. Laverton, a Director of Robert Hyde & Son Ltd. Mr. Laverton joined the company in 1930. He retired from active work in 1953, but retained his directorship of the company.

Mr. R. Parthasarathy, District Controller of Stores, Southern Railway of India, has been appointed Officiating Deputy Controller of Stores. He succeeds Mr. A. Vasudevan who is on retirement leave.

Mr. V. Venkataramayya, Engineer-in-Chief, South Eastern Railway of India, who, as recorded recently, has been appointed Chief Engineer, was born in 1908. Mr. Venkataramayya received his B.A. Degree from the Andhra University in 1929, and his B.Sc.(Eng.) Degree from the London University in 1932. Later he was awarded a first class Diploma in Civil Engineering, with distinction, at the London Polytechnic. He also received the London University Wells Gold Medal for the best engineering student in the final year. He worked for nearly two years as Inspector of Works on the former East Indian Railway, and as Civil Engineer in Tirupathi Devasthanam. Mr. Venkataramayya joined the former Bengal Nagpur Railway, in 1935, as Designer-Draftsman. He acted as Sub-divisional Officer from May, 1937, until his appointment as Assistant Engineer, in June, 1938. He became District Engineer in charge of bridges in 1945, and, from 1946, he was both Bridge Engineer and District Engineer. Later, in 1946, he joined the Railway Board, as Research Officer (Civil), in the Central Standards Office. In 1950, Mr. Venkataramayya was appointed Deputy Chief Engineer (Civil), Central Standards Office, and became Chief Engineer in 1954. He acted as Chief Design Engineer (Civil), January-July, 1935, and was on deputation abroad, 1955-56. Mr. Venkataramayya was transferred to the South Eastern Railway as Engineer-in-Chief (Construction), Bilaspur, in 1956. He acted as Chief Engineer (Construction) for three months in 1956, and as Chief Engineer (Open Line) for three months in 1958. He then returned to Bilaspur as Engineer-in-Chief, the position held until his present appointment as Chief Engineer of the Railway.

Mr. V. Venkataramayya
Appointed Chief Engineer, South Eastern Railway, India

Mr. H. D. Singh
Appointed Senior Deputy General Manager, Eastern Railway, India

British Standards Institution

Mr. R. E. Huffam, President of the British Standards Institution, has been re-elected for a second term of office. He also holds the office of Chairman of the General Council, B.S.I. Until his recent retirement, he was the United Kingdom Co-ordinating Director, Unilever Limited. Sir Roger Duncalfe, Sir Herbert Manzoni (City Engineer of Birmingham), and Mr. John Ryan (Vice-Chairman, Metal Box Co. Ltd.), have also been re-elected Deputy-Presidents. The following Members of the Divisional Councils, B.S.I., have been elected to serve on the General Council:

From the Building Division

Mr. F. Bloomer (Director & Secretary, British Sanitary Fireclay Association), Mr. E. P. Lawrence (Managing Director, Rothervale Trading Co. Ltd.), Mr. P. O. Reece (Director, Timber Development Association).

From the Chemical Division

Mr. S. J. Davies (Managing Director, A. Gallenkamp & Co. Ltd.), Mr. F. Fancutt (Assistant Director of Research, British Railways), Mr. H. W. S. Wright (Surgical Instruments & Medical Appliances Industry Standards Committee).

From the Engineering Division

Mr. J. F. Alcock (Chairman & Managing Director, Hunslet Engine Co. Ltd.), Mr. W. W. Campbell (Messrs. Merz & McLellan), Mr. S. E. Goodall (Director & Chief Engineer, W. T. Henley's Telegraph Works Limited).

From the Textile Division

Mr. H. Crawshaw (British Celanese Limited), Mr. R. Hoyle (Messrs. W. & R. Hoyle), Mr. H. L. Parsons (Research Director, Low & Bonar Limited).

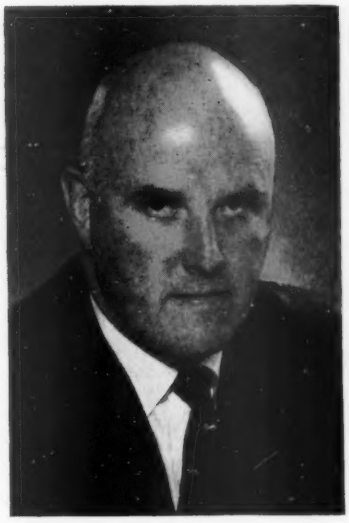
From the Codes of Practice Division

Mr. H. N. Pemberton (Chief Engineer Surveyor, Lloyd's Register of Shipping).

Mr. H. D. Singh, B.Sc., Director, Railway Stores, Indian Railway Board's office, who, as recorded in our June 12 issue, has been appointed Senior Deputy General Manager of the Eastern Railway, was born in 1907. Mr. Singh graduated in mechanical and electrical engineering from Banaras Hindu University, in 1930. He joined the Indian Railway Service of Engineers, in 1931, and was posted to the Stores Department, East Indian Railway. During the 1939-45 war Mr. Singh was District Controller of Stores at Howrah and Lillooak. After Independence, he officiated as Deputy Controller of Stores, East Indian Railway. He was transferred to the Chittaranjan Locomotive Works, in 1950, when its construction was nearly complete. In 1955 he joined the Railway Board's office as Director, Railway Equipment (later redesignated as Director, Railway Stores). In 1957 he was a member of the Steel Mission which went to Europe to purchase track material for the Indian Railways. The same year he also visited Burma and Thailand to negotiate the purchase of teak for the Indian Railways. Mr. Singh has represented the Chittaranjan Locomotive Works and the Railway Board in the Inter-Railway Golf Championship.

Mr. C. F. E. Harvey

Appointed Assistant Divisional Traffic Manager, London, Western Region



Mr. G. B. Gray

Appointed Divisional Traffic Manager, Nottingham, L.M. Region

Mr. E. Howell

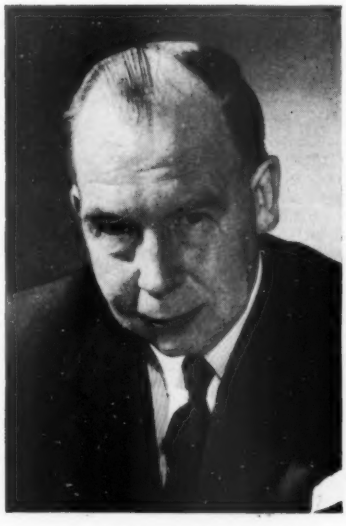
Appointed District Operating Superintendent, Kings Cross, Eastern Region

Mr. C. F. E. Harvey, New Works Assistant to the Chief Operating Superintendent, Western Region, British Railways, who, as recently recorded, has been appointed Assistant Divisional Traffic Manager, London, joined the Divisional Superintendent's Office, Paddington, Great Western Railway, in 1923. After experience at Exeter, Birmingham, and in the Superintendent of the Line's Office, Paddington, he was appointed Junior Assistant to the Divisional Superintendent at Cardiff in 1929, and at Birmingham in 1932. In 1935 he became Chief Clerk to the District Traffic Manager, Plymouth, and, in 1937, Assistant & Chief Clerk to the Divisional Superintendent, Exeter. Commissioned in 1929, in 154 Railway Operating Company, R.E., Supplementary Reserve, he was mobilised, in 1939, as Instructor, Railway Training Centre, Longmoor. He was posted to the Middle East, as Deputy Assistant Director of Transport in 1940. He subsequently commanded No. 6 Railway Operating Group, in Italy, with the rank of Lt.-Colonel. Promoted to the rank of Colonel, after the war, he commanded a railway control team in Germany. He returned to the G.W.R., in 1945, as Assistant Divisional Superintendent, Birmingham. In 1950, he became District Traffic Superintendent, Plymouth, and, in 1935, transferred to Paddington, as New Works Assistant to the Operating Superintendent.

Mr. G. B. Gray, M.A., M.Inst.T., Acting Divisional Traffic Manager, Nottingham, London Midland Region, British Railways, who, as recently recorded, has been confirmed in that appointment, was educated at Leeds Grammar School and St. Catherine's College, Cambridge. Mr. Gray joined the London & North Eastern Railway in 1932, and after training was appointed Assistant to the District Manager, Peterborough, in 1935. A year later he moved to the General Manager's Office, Kings Cross, as Assistant to the Industrial Agent. He subsequently became Assistant to the District Manager, Nottingham, 1937-39; Assistant to the District Goods & Docks Manager, West Hartlepool, 1939-41; Acting Assistant District Goods Manager, Leeds, 1941-44; Assistant District Goods & Passenger Manager, Lincoln, 1944-46; and Assistant District Goods Manager, Manchester, 1946-48. In 1948 Mr. Gray was appointed Assistant District Goods Manager, Leeds, North Eastern Region, British Railways, and, in 1949, Acting District Passenger Manager, Leeds. The following year he became Assistant District Goods Superintendent, Leeds, and a few months later was appointed District Passenger Superintendent, Newcastle. Mr. Gray went to Ireland, in 1952, as General Agent, Dublin, and in 1957 he became Divisional Traffic Manager, East Midlands

Mr. H. S. Atkins

Appointed Staff Assistant to Divisional Manager, Western Region



Mr. A. S. Mead

Appointed District Traffic Manager, New Street, Birmingham, L.M. Region

The late Mr. L. C. Purkess

Assistant to Commercial Superintendent (Passenger), L. M. Region, 1952-58

Area, London Midland Region, in January this year.

Mr. E. Howell, Modernisation & General Assistant, Line Traffic Manager's Office, Great Northern, Eastern Region, British Railways, who as recorded in our August 28 issue, has been appointed District Operating Superintendent, King's Cross, joined the London & North Eastern Railway at West Carnforth in 1934. After experience at stations, Mr. Howell became a traffic apprentice in 1937. During the war he served with 193 Railway Operating Company, Royal Engineers, attaining the rank of Major. Mr. Howell was appointed Assistant Goods Agent, Stockton, on demobilisation and was subsequently Yardmaster & Locomotive Shedmaster, Haverton Hill and Port Clarence; Yardmaster, West Hartlepool; Assistant to District Operating Superintendent, Wakefield; Assistant District Traffic Superintendent, Carlisle, and Assistant District Operating Superintendent, Nottingham Victoria. On the introduction of the new Eastern Region Traffic Organisation, he was promoted to be Modernisation & General Assistant, Line Traffic Manager's Office, Great Northern, the position he relinquishes to take up his new appointment.

Mr. H. S. Atkins, A.M.Inst.T., Head of Wages & Staff Section, Establishment & Staff Office, Paddington, Western Region, British Railways, who, as recently recorded, has been appointed Staff Assistant to the London Divisional Traffic Manager, was educated at Hinckley Grammar School and Malvern College. He joined the Great Western Railway at Hall Green, in 1925, as a booking & general clerk. In 1927 he was transferred to the Staff Section of the Divisional Superintendent's Office at Birmingham and, in 1938, moved to the General Manager's Staff Office, Paddington. During the 1939-45 war Mr. Atkins dealt with the call-up of staff for military service and the wartime labour controls. In 1948 he was promoted to be Head of the General Section of the Establishment & Staff Office, Paddington. In 1957, he was appointed Head of the Wages Staff Section of the same office, in which capacity he has acted as Secretary to the Management Side of Western Region Sectional Councils Nos. 2, 3, 4 and 5.

Mr. A. S. Mead, Head of Passenger Train Services, East Lancashire Divisional Traffic Manager's Office, London Midland Region, British Railways, who, as recently recorded, has been appointed District Passenger Manager, New Street, Birmingham, joined the former North Eastern Railway, at York, in 1921. After four years' experience at stations, goods depots, marshalling yards and docks, in the North Eastern area, Mr. Mead was transferred to the District Passenger Manager's Office at Leeds, where he specialised in passenger commercial work. In 1937 he was appointed Assistant to the District Passenger Manager, Manchester, London Road, L.N.E.R., and in 1948 became Assistant District Commercial Manager at Peterborough. He returned to Manchester, in 1950, and was concerned in the reorganisation and the closing of the former L.N.E.R. District Office. Mr. Mead was appointed Assistant District Passenger Manager, Liverpool, in 1951; Assistant District Passenger Manager, Manchester, in 1957; and Head of the Passenger Train Services in the East Lancashire Divisional Traffic Manager's Office, Manchester, in June 1958.

We regret to record the death of, on September 9, Mr. L. C. Purkess, Assistant to the Commercial Superintendent (Passenger), London Midland Region, British Railways, 1952-58. Mr. Purkess was educated at Central Foundation School, London, and joined the L.N.W.R. in 1914. After station experience he entered the District Superintendent's Office, Euston, in 1918, and was transferred to the General Superintendent's Office, Euston, four years later. He went to the General Superintendent's Office (Passenger Commercial), Derby, in 1925, but returned to London in 1929 with the Road Transport Section of that department, where he was engaged in co-ordination of rail and road transport work and, later, in traffic court work in connection with passenger and goods road licences. He was appointed Deputy Chief Passenger Rates & Charges Clerk, Chief Commercial Manager's Office, in January, 1939, and was Chairman of the Passenger Train Rates & Fares Conference for 1944. He was also engaged on special duties in connection with the R.E.C. Passenger Committee. He was appointed Assistant (Passenger Rates & Fares), Chief Commercial Manager's Office, Watford in 1946, and later became Assistant (Extra), Commercial Superintendent's Office, Euston. Mr. Purkess was made Assistant to the Commercial Superintendent (Passenger) in 1952, and retired from this position in June last year.

Mr. P. P. Narwekar has been appointed Officiating Deputy Controller of Stores, Western Railway of India.

Lt.-General Sir Ian Jacob, Director-General of the B.B.C., who will retire at the end of the year, will join the board of Fisons Limited on January 4.

Mr. W. V. Foley, has resigned from the board of Renold Chains Limited. He is going to Australia to become Chairman of the company's subsidiaries there.

Mr. L. C. Blake and Mr. A. E. Peggs have been appointed additional representatives for the London Area, of Crofts (Engineers) Limited.

Mr. P. W. Lake has been appointed Secretary and Mr. M. Field becomes Assistant Secretary of Edwin Cooper & Co. Ltd., a member of the Wakefield Castrol Group.

Mr. John McIvor has been appointed Scottish Area Sales Manager, British Materials Handling Division, Yale & Towne Manufacturing Company. Mr. G. K. Frame has been appointed Scottish Area Sales Engineer.

The Institution of Locomotive Engineers

The following names have been entered on, or transferred in, the register of members of the Institution of Locomotive Engineers:—

Associates

Mr. G. S. Gilliland, Senior Locomotive Inspecting Officer, East African Railways & Harbours.

Mr. T. W. Gould, Works Director (Technical) & Departmental Manager, George Turton, Platts & Co. Ltd.

Mr. G. V. Harvey, Director, Smiths Industrial Instruments Limited.

Mr. J. L. Hewitt, Joint Managing Director, George Turton, Platts & Co. Ltd.

Mr. W. Rose, Technical Sales Manager, Serck Radiators Limited.

Mr. G. W. Scott, Technical Service Engineer, Regent Oil Co. Ltd.

Major A. R. Tavener, Senior Inspector, Transportation Inspectorate R.E., B.A.O.R.

Mr. P. A. Willeard, Technical Representative, English Steel Corporation Limited.

Transfer Associate Member to Member

Mr. G. B. W. Dominy, Chief Mechanical Engineer, Ghana Railway.

Mr. J. M. Dudley, Locomotive Designing Engineer, English Electric Company of Australia

Mr. J. C. Farr, Traction Engineer (Diesel), Motive Power Section, C.M.E's. Branch, Western Australian Government Railways.

Mr. L. Stubbs, Engineer-in-Charge, Locomotives & Gears, Ruston & Hornsby Limited.

Mr. W. G. F. Thorley, Assistant (Utilisation) to Motive Power Officer, London Midland Region, British Railways.

Transfer Associate to Member

Mr. G. C. L. Alexander, Assistant Director of Transportation, B.A.O.R.

Transfer Graduate to Associate Member

Mr. R. C. Coombs, Research & Development Engineer, Gloucester Railway Carriage & Wagon Co. Ltd.

Mr. J. R. Gay, Senior Draughtsman, C.M. & E.E's. Department, Wolverhampton, Western Region, British Railways.

Mr. J. Jennison, Work Study Investigator (Motive Power), Euston, London Midland Region, British Railways.

Mr. B. Niven, Mechanical Engineer (Drawing Office), Malayan Railway Administration.

Mr. W. Niyogy, Coach Planning Officer, Jessop & Co. Ltd., India.

Mr. H. Pass, Chief Mechanical Draughtsman, Ebute Metta, Nigerian Railway Corporation.

Mr. W. Pickett, Technical Assistant to Director of Locomotive & Allied Manufacturers' Association.

Graduate

Mr. R. W. H. Abeykoon, Draughtsman, Victoria Railways.

Mr. D. F. Alcock, Technical Assistant, C.M. & E.E's. Department, Carriage & Wagon Works, Eastleigh, Southern Region, British Railways.

Mr. R. Boothman, Technical Assistant, B.T.C. Locomotive Testing Station, Rugby.

Mr. L. G. Curran, Senior Maintenance Engineer, Outside Department, English Electric Co. Ltd.

Mr. P. R. Hills, Engineering Graduate, Swindon Locomotive Works, Western Region, British Railways.

Mr. S. Hoontrakool, Trainee, Siamese State Railway, Bangkok.

Mr. A. Hughes, Sales Engineer, Traction Sales Department, Metropolitan - Vickers Electric Co. Ltd.

Mr. D. H. Lund, Junior Development Engineer, Traction Development Department, English Electric Co. Ltd.

Mr. S. S. Paul, Power Controller, C.M.E's. Department, Calcutta Port Commissioners.

Mr. E. G. Pochin, Drawing Office Section Leader, Beyer Peacock & Co. Ltd.

Mr. N. Ridge, General Technical Trainee, C.M.E's. Department, London Transport Executive.

Mr. F. Ross, Draughtsman, Robert Stephenson & Hawthorns Limited.

Mr. K. Saigal, Assistant Foreman Rate Fixing (Boiler), Chittaranjan Locomotive Works, India.

Mr. R. E. Wilkinson, Technical Assistant, C.M. & E.E's. Department, Derby, L.M. Region, British Railways.

Mr. P. E. Winch, Graduate, Electric Engineering Apprentice, General Electric Co. Ltd.

Students

Mr. A. C. Bailey, Engineering Apprentice, Locomotive Works, Eastleigh, Southern Region, British Railways.

Mr. R. W. Boots, Drawing Office Apprentice, General Electric Co. Ltd.

Mr. G. Grant, Apprentice Fitter, Cowlairs Works, Scottish Region, British Railways.

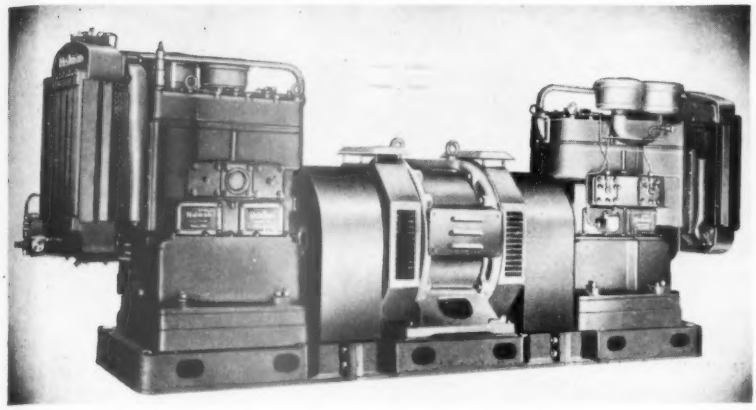
Mr. R. James, Student Apprentice, Crompton Parkinson (Chelmsford) Limited.

Mr. S. K. Sengupta, Student Apprentice, W. G. Bagnall Limited.

Mr. M. C. Srivastava, Apprentice Engineer, Hunslet Engine Co. Ltd.

Mr. A. Turner, Locomotive Draughtsman (Junior), Hudswell Clarke & Co. Ltd.

NEW EQUIPMENT AND PROCESSES



Duplex Compressor Unit

NEW to the range of Holman stationary air compressors is the Duplex compressor unit designed for permanent installation where large quantities of compressed air are required. The unit comprises a centrally-mounted electric motor of 156 or 230 b.h.p. fitted at each end with a driving shaft extension to which are coupled two T.60 R or T.36 R compressors. Drive is through flexible or centrifugal couplings, depending on type of motor and control gear used.

A unit comprising two T.60 R compressors produces 1,050 cu. ft. per min. at 100 lb. per sq. in. and can operate at pressures up to 150 lb. per sq. in. with an operating speed of 720 r.p.m. Alternatively, 610 cu. ft. per min. at 100 lb. per sq. in. is produced by two T.36 R compressors operating at 1,000 r.p.m. This unit is also capable of operation up to 150 lb. per sq. in.

Two-stage reciprocating compressors are used. These are economical in running and maintenance and wear of moving parts is minimised. Automatic control equipment limis actual running time to the period for which compressed air is required. Where a number of sets are in operation, selection equipment can ensure an even loading cycle, thus preventing continuous maximum loading of any one unit.

An air blast aftercooler is recommended for use when exceptionally cool, dry air is required. Like the compressor, it does not require an external source of coolant and the motor can be electrically interlocked with that of the compressor.

An unloading pilot valve can be set to unload delivery at any predetermined pressure thus ensuring safe operation at all times.

Bearings are lubricated by a pump driven by gearing from the crankshaft. The pump draws oil from the sump, through a removable filter, and delivers it to each of the main bearings, big-ends, and gudgeon pins. A relief valve on the oil pump cover enables the pressure in the oil system to be controlled. On the T.36 R the low and high-pressure cylinders and valves are lubricated by a visual drip feed lubricator, while on the T.60 R, they are lubricated by a sight feed lubricator driven by the gearing on the end of the crankshaft. Both types of lubricators can be regulated.

Cylinders and valve ports are cooled by a closed circuit system of water cooling. Air from the first stage of compression, together with the circulating water, is cooled by a common balanced fan driven from the compressor crankshaft. This system prevents overcooling and the depositing of moisture in the high pressure cylinders.

Overall measurements are as follow: Using the T.60 R compressors, 192 in. long x 43 in. wide x 73 in. high. Weight is 17,000 lb. The T.36 R unit is 152 in. long x 35 in. wide x 58 in. high and weighs 10,000 lb. (Length and weight will vary according to type and make of electric motor employed.)

Both compressor sets can be supplied with flameproof motors and protective devices in conformity with National Coal Board requirements.

Further details can be obtained from the manufacturer, Holman Bros. Ltd., Camborne, Cornwall.

Dressing Tools

THE abrasive surface of Lazmet Diard grinding wheel dressers is composed of extremely hard matrix impregnated with small diamonds against the conventional singly-mounted diamond, which requires constant re-setting or smaller diamonds set in a relatively soft matrix which tends to disintegrate. The matrix of the new dressers, in addition to providing an extremely firm bond for the diamonds, also acts as an abrasive. These tools will withstand a considerable amount of abuse and may be safely used by semi-skilled or unskilled operators; tests have proved that their life is five times that of the older type of dresser.

An impregnated hand lap is also available for use with carbide-tip tools. It has an abrasive surface of similar composition which eliminates grooving of the tool during use.

Further details of these products can be obtained from the distributor, Samuel Osborn & Co. Ltd., Clyde Steel Works, Sheffield, 3.

New Hydraulic Valve

THE 4879 valve is designed for the hydraulic operation of heavy-duty clutch and brake mechanisms, such as those used on cranes and winches, or any similar mechanisms requiring constant manual control. Although the maximum pull required on its lever is only 18 lb. the full hydraulic pressure of 1,500 lb. per sq. in. can be sensed and controlled.

The following advantages are claimed for the valve:—

Increased movement of the control will give a corresponding increase in hydraulic pressure providing progressive braking or de-clutching. The greater the hydraulic

pressure applied to the actuators the greater the resistance felt by the operator.

The operator is given a sense of feeling the hydraulic pressure—movement of the lever will produce resistance proportional to the movement of the hydraulic actuator.

The valve is available to operate with an input pressure of not more than 1,500 lb. per sq. in. There are three "reduced pressures" available: 0-500 lb. per sq. in.; 0-1,200 lb. per sq. in.; 0-1,500 lb. per sq. in. Port sizes are all ¾ in. B.S.P. The valves can be supplied singly or in multiples up to six.

Further details can be obtained from the manufacturers, Keelavite Hydraulics Limited, Allesley, Warwicks.

Contact Welding Electrode

THE C/16 is a new zircon iron powder-coated electrode which has been developed for rapid, trouble-free contact welding of all mild and low alloy steels in downhand, standing fillet, and horizontal-vertical positions. It has been approved by the Ministry of Transport and Lloyds.

The welds produced, which are flat or slightly convex, are neat and clean. Ductility is claimed to be higher than that of other electrodes. Slag is self-removing.

A leaflet giving full technical and test data and chemical analysis is obtainable from the manufacturer, Philips Electrical (Industrial Products Division), Century House, Shaftesbury Avenue, London, W.C.2.

Water-saving Tap

THE Mezurtap is a new auxiliary fitting designed for use where stringent saving in water for hand-washing is a necessity. It is operated by a thumb push which releases only one pint of water in about 45 secs. and yet leaves both hands free.

It will be on view at the Building Exhibition at Olympia, November 18—December 2. Further details can be obtained from the manufacturer, Walker, Crosweller & Co. Ltd., Cheltenham, Glos.

Thermostatic Valve

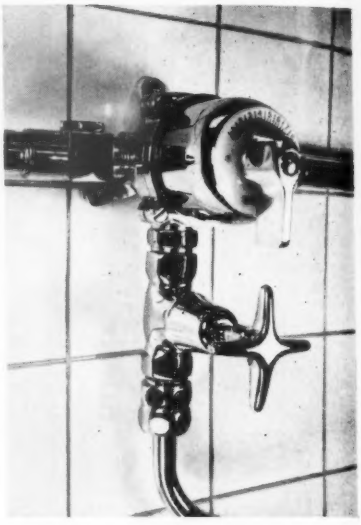
THE Leonard 21 is an entirely new thermostatic valve intended for single showers or washbasins. An outstanding feature is the regulating handle with indicating scaleplate for quick temperature selection. The self-contained thermostat assembly fits into the body of the valve which is quickly assembled and dismantled.

Further details of this product, which will be on view at the coming Building Exhibition at Olympia, can be obtained from the manufacturer, Walker, Crosweller & Co. Ltd., Cheltenham, Glos.

Portable Grinder for Railways

A PORTABLE rail surface grinder using a continuous abrasive belt is claimed to cut rail surface grinding time to less than half that required by conventional methods.

The machine contours the head of the rail as the operator, holding handlebar grips, moves the machine forward and backward and laterally adjusts the grinding unit in its carriage assembly. The wheels are insulated to avoid interference with track circuits. The grinder can be lifted from the track like a wheelbarrow and rolled on 16-in. ballbearing semi-pneumatic-tyre wheels. The grinding head can be detached from the frame and each part lifted off separately.



The 106-in. 24-grit belt shapes itself to the contour of the railhead.

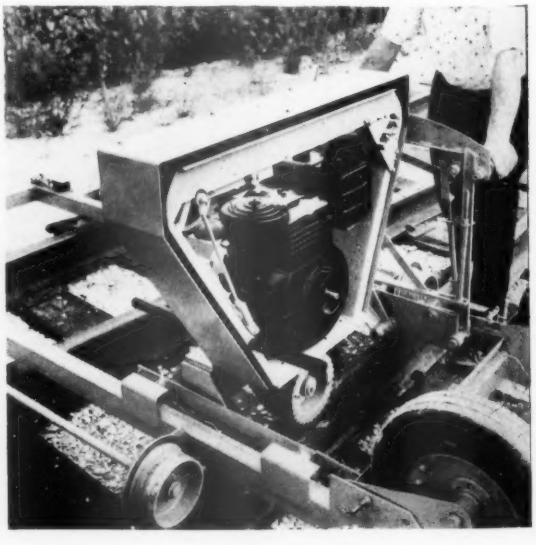
Further particulars can be obtained from the National Cylinder Gas Division of the Chemetron Corporation, Chicago, U.S.A.

Sodium Lighting

AN important new development in sodium lamps is to be shown at the forthcoming A.P.L.E. Exhibition & Conference in Aberdeen.

Close attention to the radiating surface of the discharge tube and improved high vacuum techniques applied to the lamp envelope have enabled average-throughout-life light output increases of 40 per cent for the 45W lamp, 33¼ per cent increase for the 60W lamp and more than 40 per cent increase for the 140W ratings.

Further details can be obtained from Philips Electrical Limited, Century House, Shaftesbury Avenue, London, W.C.2.



East Indian Railway Annual Dinner

Heavy burden on the railways in expanding economy and industrialisation of India

The 56th annual dinner of the East Indian Railway Officers' Association was held in the Connaught Rooms, London, W.C.2, on September 30. The chair was taken by Mr. A. V. Venables, a former General Manager of the E.I.R.

Mr. Venables, after the Loyal Toast, proposed that of the East Indian Railway. He paid a tribute to the senior inspectors who had contributed so much to the efficiency of the E.I.R. He himself had joined the company's staff as junior officer in 1903, and had received much help from the inspectors. He went on to express regret at the absence through illness of Mr. J. A. Bell, a former General Manager, and Chairman of the Dinner Committee of the E.I.R. Officers' Association, who was reported to be recovering.

Mr. C. N. Burns proposed the health of the guests.

Mr. David Faed Macmillan, a former senior partner of Andrew Yule & Co. Ltd., replied. He pointed out that he could speak as a customer of the E.I.R. and its successor, the Eastern Railway, and of other Indian State Railways.

Insufficient Funds for Railway Development

The railways of India, he stated, had received step-motherly treatment from the Government, which had not treated them fairly in allocating resources to enable them to meet the exacting demands placed on them. At the end of the war they had been in serious need of rehabilitation.

Meanwhile, transport demands had increased and continued to increase. The output of steel in India had risen five-fold. Mr. Macmillan wondered whether the Indian Government, in making its plans, had taken into account the capacity of the railways for additional traffic.

Supply of wagons for movement of coal from collieries remained a problem today, as it had been 100 years ago. Mr. Macmillan read a telegram sent in June, 1857, by an agent at a colliery which showed how availability of wagons at the pithead had already become a restricting factor.

The railways, he continued, had done a good job in moving goods. There was still healthy rivalry between the Eastern, as the former East Indian, and the South Eastern, as the former Bengal Nagpur, Railways. Much progress was being achieved in increasing trackage and building marshalling yards and new lines for mineral traffic. He was much struck by the layout of the Chittaranjan Locomotive Works.

Mr. R. C. Harvey, Honorary Secretary of the Association, stated that on July 18, plaques of 12 regiments of the Auxiliary Force of India, including the E.I.R., had been unveiled in the Indian Army Memorial Room of the museum at the Royal Military Academy, Sandhurst.

Those present were:

Messrs. J. M. Agabeg, H. J. Allinson, K. O. Bathgate, E. P. Blake, G. J. Bridges, G. W. Browne, C. S. Buike, C. N. Burns, H. Crawshaw, A. C. Ducasse,

J. M. Fenton, E. R. Fleeton, A. Gemmell J. C. Gibson, A. R. Gundry, Sir Hugh Hannay, Messrs. R. C. Harvey, J. R, Hemsley, G. Hewitt, E. H. B. Heysham, D. H. Hughes, R. G. Hughff,

H. L. Kelly, T. T. Lambe, P. Lemondine, Sir Robert Marriott, Messrs. F. G. S. Martin, S. A. Macjohn, D. H. Murray, R. S. Oakley, Captain E. M. Padwick, Messrs. J. F. Pegg, A. H. Powell,

S. C. Ribbins, D. D. Roberts, E. J. N. Robertson, G. W. N. Rose, R. Saunders-Jacobs, H. J. A. Slator, A. G. Stavridi, H. V. M. Stewart, J. S. Tritton, O. R. Tucker, F. E. Webster,

Guests: Messrs. R. W. Bishop, N. Calder, P. H. S. Drew, E. Gardner, J. H. Gundry, R. W. H. Gundry, C. J. Harvey, Brigadier F. T. Jones, Messrs. D. F. Macmillan, W. J. A. Moore, R. R. Parker, A. Sykes.

Railway Swimming Championships for Women

The second European International Railway Swimming & Diving Championships for Women of the Union Sportive Internationale des Cheminots were held at the Wales Empire Pool at Cardiff on September 21 and 22. British Railways, Western Region, undertook the organisation of the event on behalf of all Regions. Teams competed from Great Britain, France, Eastern and Western Germany, Hungary, Poland, and Roumania. This was the first occasion on which one of these international events had been staged in this country.

Civic Reception and Luncheon

Some 300 competitors and officials were accorded a civic reception at the City Hall, and a luncheon was given in their honour by the Lord Mayor of Cardiff, Alderman Helena Evans, supported by a representative gathering of civic dignitaries.

Mr. J. R. Hammond, General Manager, Western Region, speaking after luncheon, expressed his appreciation to the Lord Mayor and City Council for their welcome and of the assistance which they and everyone at Cardiff had given in staging this event. Mr. Hammond was accompanied by Mr. A. Chamberlain and Mr. Cecil W. Rodd, Members of the Western Area Board; Mr. W. R. Stevens, Divisional Traffic Manager; Mr. W. Jeffers, Chief Docks Manager, South Wales Docks, and Mrs. Jeffers; Mr. H. R. Chubb, Regional Welfare Officer; and district officers of the Western Region.

The Wales Empire Pool, which seats 1,750, was well attended on both evenings. In the final result Hungary gained first place, with Roumania and Great Britain tying for second place.

Mr. Hammond presented the awards on the Monday evening, September 21, when Mr. K. W. C. Grand, Member, British Transport Commission, was also present. Lady Benstead, who was accompanied by Sir John Benstead, Deputy Chairman, British Transport Commission, made the presentations on the Tuesday, when there was almost a capacity audience.

The conclusion of the event was marked by a dinner given by the B.T.C. at which Mr. C. S. McLeod, Director of Industrial Relations, presided. Others present were Monsieur Marc Pernot, President of the U.S.I.C., and Madame Pernot; the Lord Mayor; Mr. S. G. Ward, Regional Establishment & Staff Officer, and Mrs. Ward; Mr. and Mrs. W. R. Stevens; and Messrs. C. J. Rider, Public Relations & Publicity Officer, Western Region, H. Aidley, Regional Establishment & Staff Officer, London Midland Region, and W. Jeffers.

The illustration shows at the civic luncheon on September 21 (top table, left to right): Messrs. J. F. M. Taylor, District Operating Superintendent, Western Region, Swansea; J. H. F. Page, District Operating Superintendent, Cardiff; H. R. Chubb; W. Jeffers; Mrs. Jeffers; the Deputy Lord Mayor, Councillor F. Basil Bevan; the Deputy Lady Mayoress, Mrs. F. B. Bevan; Mr. Cecil W. Rodd; Alderman J. R. Lyons, Chairman, Baths Committee; Mr. J. R. Hammond; the Lord Mayor; the Lord Mayor's consort, Mr. Raymond Evans; Mr. A. Chamberlain; Mrs. E. G. Davies; Councillor E. G. Davies; Mr. W. R. Stevens; Mrs. R. E. Brabyn; Mr. R. E. Brabyn, President, Welsh Amateur Swimming Association; Mrs. W. Evans; and the Lord Mayor's Chaplain, the Rev. W. D. Evans.

SUPERHEATER CO. LTD. INTERIM DIVIDEND.—The board of the Superheater Co. Ltd. has declared an interim dividend of 4½d. a share on the issued ordinary and "A" ordinary shares. The board states that for the eight months of this year sales show a slight decrease on those for the corresponding period of last year.

At the luncheon given by the Lord Mayor of Cardiff on the occasion of the European International Railway Swimming & Diving Championships for Women of the Union Sportive Internationale des Cheminots.

International Railway Medical Congress

The causes of premature retirement and death among railwaymen were the principal subject discussed at the Eighth Congress of the International Union of Railway Medical Services in Lucerne on September 21-26.

A paper on this subject was presented to the Congress by Dr. Daenen, of the Belgian National Railways, who had made a two-year study of the problem with the co-operation of the medical services of the affiliated railway administrations. Delegates discussed the paper in detail. Their conclusions will be sent to the medical services of member railway administrations.

Doctors representing British Railways and London Transport Executive were among the delegates from 24 administrations which took part in the Congress, including those from most European countries, Algeria, and Japan. The Congress was held under the chairmanship of the President of the Union, Dr. A. Serati, Chief Medical Officer of the Swiss Federal Railways, and was opened by Dr. H. Gschwind, President of the Board of the S.F.R.

Guest representatives at the Congress included Dr. Gerstle, of the American Industrial Medical Association, who presented a paper; and representatives of the American Association of Railroad Surgeons.

British Railways and London Transport representatives were: Dr. J. Sharp Grant, Eastern Region, a Vice-President of the Union; Dr. G. E. Graves Peirce, London Midland Region; Dr. R. F. MacKenzie, North Eastern Region; Dr. L. J. Haydon, Southern Region; Dr. W. A. R. Mailer, Scottish Region; Dr. C. F. Newnham, Western Region; and Dr. A Raffle, London Transport.

Alterations to L.M. Region Express Services

To facilitate the speed-up of modernisation and electrification of the British Railways, London Midland Region, main line between Crewe and Euston recently foreshadowed in the re-appraisal of the railway modernisation plan, important alterations to train services are to take place. From November 2, all London Midland Region express services between Euston, Birmingham New Street, and Wolverhampton High Level will be suspended; but an augmented service will be given on the Western Region between Paddington, Birmingham Snow Hill, and Wolverhampton Low Level. This will mean that Coventry, which is on the main London Midland route between Rugby and Birmingham will no longer be served direct by express trains from Euston, but certain main line trains to and from Euston will call additionally at Rugby and from there passengers will travel by diesel train to Coventry.

To assist the engineers, certain Manchester trains will also be diverted from the Euston route and will run instead to and from St. Pancras; the diversion of some of these trains will start from October 24. The present sleeping car services between Euston and Manchester London Road will continue to run between those points, but will leave a little earlier.

Stafford-Rugby Line Possession

On Sundays the engineers require complete possession of the main line between Stafford and Rugby. All main line trains will have to be diverted via Bescot, Stechford, and Coventry. This will mean additional running time of 20 to 40 min. and this Sunday diversion will be in force for about two years.

Inevitably the incidence of engineering work will mean all weekday expresses between Euston, Manchester, Liverpool, and the North West will have their journey times increased by up to 20 min. The times of Anglo-Scottish day expresses have been altered and in some cases their running times reduced. The "Royal Scot" and "Midday Scot" will run with limited accommodation and all seats will be reservable in advance.

Railway Queen's Visit to Shrewsbury

Miss Hazel Dobinson carried out her first official visit as Britain's Railway Queen when she visited Shrewsbury on Friday and Saturday, September 25 and 26 at the invitation of Shrewsbury railwaymen.

A joint committee comprising officials and trade unionists of all grades has been formed at Shrewsbury to give help to the children at Condover Hall and, after lunch with the committee, Miss Dobinson was taken to the Hall to see the work being done for these handicapped children, some of whom are totally blind, some blind and deaf, and others with varying degrees of physical disability.

After the visit, Miss Dobinson was given a civic reception by the Mayor and Mayoress of Shrewsbury in the Guildhall and was presented with a brooch bearing the Shrewsbury Coat of Arms by the Mayor. In the evening she attended a charity ball organised by railwaymen in aid of the children's fund and, in her reply to the Mayor's speech of welcome, she stated that what she had seen during her tour of the children's home had made an impression that would remain with her all her life and she was proud to think that railwaymen were voluntarily assisting in the valuable work being done for the children.

Miss Dobinson was an honoured guest at the Hall on Friday night and on Saturday morning the whole school assembled to show her the results of their training by giving a concert in her honour, with piano solos and singing by a choir of blind children, under the direction of their musical tutor, also blind. A parting gift was made by the presentation of a fireside stool made by one of the blind boys in the school.

Visit to Temple Mills Yard and Clacton Electrification

The autumn technical visit of the Institution of Railway Signal Engineers took place on September 19. At the invitation of the General Manager, Eastern Region, British Railways, Mr. H. C. Johnson, members visited the mechanised marshalling yard at Temple Mills and the electrified line between Colchester and Clacton.

The party, numbering about 120, was led by the President, Mr. D. G. Shipp, supported by Mr. W. Owen and Mr. F. G. Hathaway, Vice-Presidents; Mr. E. G. Brentnall, Past President; several Members of Council; Mr. V. H. Smith, Hon. Secretary, General Purposes Committee, and Mr. B. Reynolds, Hon. Treasurer for Conventions and Visits.

Assembling at Stratford Station members were welcomed by Mr. R. A. Green, Signal Engineer, Eastern Region, a Member of Council, who was accompanied by members of his technical staff. A well-illustrated printed description of the installation was handed to visitors. A special diesel train conveyed the party to Temple Mills.

Control Cabin in Yard

The yard, described in our May 15 issue, includes at the hump a cabin where actuation of buttons on a panel decides the route-setting and "cut" descriptions, while transmitting the required information forward to the control tower from which the electro-pneumatic retarders are controlled.

The cabin is equipped with electrical storage apparatus, using electronic controls for assessment of wagon weights, rate of travel and so on to give automatic finger-tip control of each wagon as it descends towards the sidings.

The signalboxes at the east and west end of the layout operate on the entrance and exit route-setting principle. The telecommunications system is very complete, with radio control of engine movements, loud speakers for directing ground staff, and other facilities. Details were explained to the visitors.

Mr. D. G. Shipp presided at luncheon at the Swan Hotel, Stratford. He expressed the thanks of all present to the Eastern Region and its officers who had planned the visit and enabled them to see so many interesting things in the time available.

Mr. R. A. Green stated in reply how much pleasure it gave him and his staff to receive the Institution party and show the progress being made in applying the latest developments to Eastern Region yards and also running lines.

Inspection of A.C. Electrification

The party then travelled by special train to Clacton. Between Colchester and Clacton the 25,000V. a.c. system of traction has been in regular operation since April.

The booklet handed to the visitors gave details of the extensive work required to prepare the route for conversion, which included comprehensive tests in connection with the problem of interference with both signalling and telecommunications equipment. The results of these tests were embodied in the apparatus finally adopted, which has functioned satisfactorily.

Several signalboxes were closed and others modernised. Continuous track circuiting was provided. Details of these and civil engineering features were also supplied to the party and reference made to the work being done in connection with the eventual conversion of the 1,500-V. d.c. lines from London to Chelmsford and Southend to the high voltage a.c. system.

From Clacton the special train returned direct to Liverpool Street.

Temporary Sunday Closing of Glasgow Central Station

Glasgow Central Station, British Railways, Scottish Region, will be closed on Sundays for the duration of the winter. This is necessary to assist with the installation o colour-light signalling. Until April 10, 1960, Sunday train services normally using Glasgow Central Station start from or arrive at St. Enoch of Buchanan Street Stations. The alterations took effect from October 4.

The work being carried out at Glasgow Central Station on Sundays is important preparatory work for the major re-signalling scheme which is at present being carried out as part of the Glasgow Suburban electrification project. Signalling cables are being installed and at the same time, certain alterations to the permanent way carried out to coincide with the requirements of the new signalling scheme.

Adjustments to Train Services

The 9.40 a.m. and 9.5 p.m. Sunday trains from Glasgow to London St. Pancras, and the 10.20 p.m. and 10.25 p.m. Sunday trains to London Euston depart from St. Enoch Station; the 10.20 p.m. train, however, is timed to leave St. Enoch 10 min. earlier—at 10.10 p.m. The 11.20 p.m. Saturday night train from London Euston and the 9.15 p.m.

Saturday night and 10.0 a.m. Sunday morning trains from St. Pancras to Glasgow arrive at St. Enoch Station on Sundays.

All Sunday trains to and from Gourock, Largs, Ardrossan, Ayr, Girvan, Stranraer, Kilmarnock, Dunfries and Annan leave from and arrive at St. Enoch Station until April 10 and, with the exception of the Gourock trains, all these services will continue to use St. Enoch Station until September, 1960. On Saturday nights, until April 9, 1960, the 10.10 p.m. train from Gourock to Glasgow Central will be diverted to St. Enoch Station, arriving there at 11.11 p.m.

Sunday trains from Buchanan Street Station include the 10.0 a.m., 6.50 p.m. and 9.25 p.m. to London Euston; the 9.25 a.m. and 11.15 p.m. to Birmingham; the 11.15 a.m. to Liverpool and Manchester; the 11.40 p.m. to Liverpool, and the 11.55 p.m. to Manchester. Trains arriving at Buchanan Street Station on Sundays are the 9.5 p.m. (Saturday nights) and 9.50 a.m. (Sundays) from London Euston; the 11.20 p.m. (Saturday nights) and 11.10 a.m. (Sundays) from Birmingham; the 12.45 a.m. and 9.40 a.m. from Liverpool and the 1.3 a.m. and 9.30 a.m. from Manchester. On Saturday nights the 10.45 p.m. from Edinburgh Princes Street to Glasgow Central is being diverted to Buchanan Street Station which is reached at 12.13 a.m.

Sunday trains between Glasgow, Larbert, Stirling, Perth, Dundee and the North depart from and arrive at Queen Street Station, with the exception of the 7.35 a.m. from Glasgow to Aberdeen, and Inverness, which continues to depart from Buchanan Street Station. At Glasgow Central Station the inquiry office remains open on Sundays to deal with normal inquiries, seat and sleeper reservations, and the left luggage office is also open. These facilities are available similarly at St. Enoch, Buchanan Street and Queen Street Stations.

Staff and Labour Matters

N.U.R. Policy Statement on Transport

The N.U.R. published in booklet form a comprehensive statement of transport policy, the main features of which are:—

1. Co-ordination of the major forms of transport.
2. Modernisation that does not include contraction based on short-sighted economies, but would allow increased railway facilities and provision for the bulk of long-distance freight to go by rail.
3. Interest-free government loans for modernisation.
4. Relief for the B.T.C. of some of the interest burden on original compensation stock—particularly on redundant or obsolescent assets.
5. That the B.T.C. should not bear the cost of services for strategical or defence purposes, nor the cost of maintaining road bridges over railways and pleasure canals, etc.
6. Compensation for the B.T.C. if it is expected to keep fares and charges below the economic cost of providing them.
7. Control of long-distance road haulage by limitation of area of operation for commercial operators. Control of "C" licensed vehicles by limited radius and proof of need.
8. That private passenger undertakings be transferred to public ownership to allow proper organisation of passenger transport — municipal undertakings to co-ordinate with national and area schemes.
9. Management personnel to have a co-ordinated outlook—viewing transport as one industry. Area Transport Boards made up of functional management — present Regional Boards would be unnecessary.
10. At least Civil Service conditions for workers. Minimum working conditions laid down by law, to include legal prevention of excessive hours.
11. Guarantees for workers who become victims of technical changes.
12. Full use of railway workshops—even for work outside the industry.

The booklet states:—

Railwaymen want to see transport sensibly planned for the public's benefit as well as their own.

To achieve the efficient, adequate, and economic transport system envisaged requires an acceptance of the fact that such a system must be based on the principle of integration and co-ordination of the basic forms of transport. Political decisions, which will inevitably lead to the suppression of certain vested interests, must be taken. The primary obstacles to be expected are political and not technical. The greatest and most persistent opposition will come from private vested interests in the road transport and the constituent sections of the motor industry—oil suppliers, manufacturers of vehicles and equipment, builders of roads and their "furnishings" such as petrol stations, and the finance houses involved in all this activity.

As for those who work in the industry, they have a right, by virtue of their importance to the national economy and to society generally, to be treated not less favourably than other workers, as far as wages and conditions of service are concerned.

Transport integration presupposes the development, modernisation, and rationalisation of the railway system. Without a modern railway system a scheme of co-ordination and integration will not achieve balance and economy with other forms of transport. The organisers of transport should recognise that this is not a static conception. Having a modern railway system implies development and change in equipment, techniques and operation. This will have to be continuous if the full benefits of technology are to be gained. It must also be continuous because railway transport facilities must move as closely parallel as possible with variable flows and volumes of traffic; and this must be considered within the whole flexible inner operation of the over-all framework of road-rail-inland waterways integration of transport facilities.

The unions have always stressed that the financial burdens placed on nationalised transport have been insupportable. The Commission has been faced with an impossible task. It was expected to pay interest on capital structure and to redeem the capital without first having the physical resources necessary to enable it to earn sufficient revenue; without freedom to make economic charges for its services at the same time as it was forced to pay current prices for the commodities it required and in an atmosphere of great difficulty caused by Government neglect of its investment needs and by undue interference in its management.

Any future Government must tackle this immense impediment to the Commission's efforts to carry out its duty to the nation, and which has bedevilled the legitimate attempts of railwaymen to maintain their pay and conditions of service at a reasonable level.

An integrated transport system, of course, involves control of the road haulage sector. This should be done by (1) a return to control of long-distance road haulage now operated by "A" and "B" licences. This control would mean that operators of these vehicles would be confined to a specified area, as laid down in the 1947 Transport Act, and (2) control of "C" licensed vehicles. Our view is that the only way this can be effectively done is by a combination of control by radius and proof of need.

It is vitally necessary in this set-up to allow for the contribution which can be made by the workers in the industry. Machinery for this already exists. It must be made to function properly and adequately. There is no sense in attempting to run a complex industry like transport without partnership between management and staff. A prerequisite to this partnership is that the staff should be satisfied that they are getting justice in terms of adequate pay and conditions of service.

Contracts and Tenders

Main-line diesel locomotives for British Railways

The British Transport Commission has placed orders with British Railways' workshops at Crewe, Doncaster, and Swindon for a further 80 main-line diesel-powered locomotives. This brings to over 400 the number of main-line diesel locomotives to be built in railway workshops for the modernisation programme. These new orders are valued at £8,750,000. Six of the locomotives will be of the electro-diesel type, which is entirely new to Britain. They will be built by the Doncaster Works for the Southern Region. These electro-diesel locomotives will be able to run as electric locomotives on electrified lines or under their own diesel power elsewhere. The remaining 74 locomotives will have diesel engines of 2,700 h.p. with hydraulic transmissions, and are for the Western Region. Swindon Works will build 35, and Crewe Works 39. Delivery of both types of locomotives will begin in 1961.

The London Transport Executive has placed a contract with George Cohen, Sons & Co. Ltd. for the removal of 24,000 poles supporting overhead trolley-bus wires. Removal of the poles will follow the phased withdrawal of the large majority of trolley-bus services, which began earlier this year, and will be completed in three years.

The Canadian National Railways has placed contracts for work on the new headquarters office and garage building being constructed in Montreal. The contract for general works has been awarded to E.G.M. Cape & Co. (1956) Ltd., and the principal sub-contractors are Wilfrid D. St.-Cyr Limited, Connolly & Twizell Limited, and the Standard Electric Co. Inc.

The Special Register Information Service Export Services Branch, Board of Trade, has received calls for tenders as follow:

From India:

Manufacture, supply, erectio,n and supervision of operation and maintenance for a period of one year, of 25-kV. single-phase 50-cycle a.c. overhead traction equipment for the following sections of the Indian Railways on 5 ft. 6 in. gauge :—

Gaya (exclusive) to Mughalsarai (inclusive) on the Eastern Railway, route mileage 126, track mileage 301; and Kharagpur (inclusive) to Tatanagar (exclusive) on the

South Eastern Railway, route mileage 83, track mileage 113.

The Issuing Authority is the General Manager and Chief Engineer, Railway Electrification, Calcutta (Ministry of Railways, Government of India). Tender papers containing instructions to tenderers, general and special conditions of contract and specifications and a set of drawings may be purchased from the office of the General Manager and Chief Engineer, Railway Electrification, 235, Lower Circular Road, Calcutta, 20, on payment of Rs. 100 per copy per group, which shall be deposited in cash with the Cashier, Railway Electrification, 232, Lower Circular Road, Calcutta, 20, or sent by money order to the above named official. The closing date is December, 15, 1959. The Board of Trade reference is ESB/23218/59.

From Iran :

50,000 fishplates with four and six holes
100,000 bolts and nuts for fishplates
300,000 spring washers.

The Issuing Authority and address to which bids should be sent is the Purchase Administration (Tenders & Contracts Dept.), Iranian State Railways, Tehran. The tender No. is 38/231. The closing date is October 24, 1959. The Board of Trade reference is ESB/21968/59.

From Sudan :

Hand pump trolleys
Motor trolleys
Oil tank wagons
Water tank wagons
Box wagons.

The issuing authority is the Sudan Gezira Board. Detailed specifications and conditions can be obtained from the Assistant General Manager (Supplies), The Sudan Gezira Board, Barakat, on application. The closing date is November 7, 1959. The Board of Trade reference is November 7, 1959.

From Formosa :

14,300 *tonnes* of 37kg. rails of 15m. length
2,300 *tonnes* of 22kg. rails of 10m. length.

The issuing authority and address to which bids should be sent is the Central Trust of China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan (Formosa). The tender No. is US-654. This purchase will be financed by the International Co-operaton Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is October 24, 1959. The Board of Trade reference is ESB/23241/59/ICA.

Further details relating to the above tenders together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

Alterations to Sheffield-Doncaster Service.—On introduction of the winter passenger timetable on November 2, British Railways, Eastern Region, is to alter the routing of certain trains between Sheffield and Doncaster. Some services will be diverted to run to and from Sheffield Midland instead of Sheffield Victoria. All the diverted trains will be worked by diesel multiple-unit sets.

Southern Railway Association.—The twelfth annual reunion luncheon of the Southern Railway Association was held at the Charing Cross Hotel on Tuesday, October 6, 1959, with Colonel Sir Eric Gore-Browne, the last Chairman of the Southern Railway Company, presiding. Sir Philip Warter, Chairman of the Southern Area Board, British Transport Commission, and Mr. Charles Hopkins, General Manager of the Southern Region of British Railways, were guests of the Association.

New Advertising Sites at Liverpool Street.—The accompanying illustration shows some of the new positions created by the commercial advertising service of the British Transport Commission on several platforms at Liverpool Street Station, British Railways, Eastern Region, which handles more than 55,000,000 passengers a year. The sites are

One of the new poster sites at Liverpool Street, showing accommodation for four-sheet and double-crown posters

are "Travel Game" (first prize, Public placed around pillars, each of which accommodates two four-sheet and eight double crown posters. A total of 200 new positions is to be provided in this way. The work now being undertaken at Liverpool Street is part of a programme for improving many British Transport Advertising sites. The new sites were constructed and installed by the Partington Advertising Co. Ltd.

Arc Welding Electrode Prices Reduced.—The prices of all English Electric Co. Ltd. mild steel electrodes have been reduced by 5 per cent. This reduction covers 12 types: the all-position Enrox, Vohees, and Vertees; the iron powder types Speedees, Hermees, and Pressurees I.P. 1; and six other types in the present range, Lowhees, Deepees, Herculees 35, Pressurees, Fillerees, and the new electrode Weldees.

Railway Students' Association Session, 1959-60.—Mr. H. C. Johnson, General Manager, British Railways, Eastern Region, has accepted the office of President of the Railway Students' Association for the session 1959-60. The opening meeting will take place at the London School of Economics, Houghton Street, W.C.2, at 6.30 p.m. on October 28, when Mr. Johnson will give his presidential address. The chair will be taken by the retiring President, Mr. A. B. B. Valentine, Chairman, London Transport Executive.

Temporary L.T.E. Green Line Coach Station At Elizabeth Bridge, Victoria.—The London Transport Executive Green Line coach station in central London at Eccleston Bridge, Victoria, used by over 600 coaches a day, was moved to nearby Elizabeth Bridge on September 27. Nearly half of London Transport's 30 Green Line coach routes are affected. The stopping arrangements at Elizabeth Bridge will be identical with those at Eccleston Bridge and large signs will direct passengers to the new temporary coach station which will be in use until next May when Eccleston Bridge, which is to be reconstructed, is reopened.

Young Canadians Study British Engineering.—Forty young Canadian engineers, mostly graduates direct from Canadian Universities, have arrived in the United Kingdom under the Athlone Fellowship Scheme. The Fellowships, which are of two years duration, are available for works training in United Kingdom industrial organisations, or training with consulting engineers, or post-graduate study in a United Kingdom university, college or research establishment, or a combination of any of these. The scheme is financed by the Board of Trade with the object of enabling selected Canadian engineers to obtain first-hand information of the scope and quality of engineering research, development, design and production in the United Kingdom.

Holiday Film Shows at Liverpool Street Station.—People working in the City of London now have the opportunity of seeing, free, in their lunch hour, some of the films which have gained awards at recent international film festivals. British Railways, Eastern Region, has arranged film shows in the gymnasium near the west side entrance to Liverpool Street Station. Colour films depict country and seaside resorts in Britain and on the Continent. It is hoped that they will help to suggest ideas for next year's holidays. Two 40 min. shows, starting at 12.10 p.m. and 1.10 p.m., are being given every Thursday until November 26, and from January 7 to April 7, 1960. There is a change of programme every week. Railway representatives are on hand to advise on travel. Among the films being screened are "Travel Game" (first prize, Public

Relations Category, Harrogate Film Festival, 1959); "Between the Tides" (first prize, Venice Film Festival, 1958, Diploma of Merit, International Scientific Film Congress, Moscow, 1958); and "Journey into Spring" (British Film Academy Award, 1957, Best Documentary from any source).

Associated Belting Companies Limited.—The group net loss by Associated Belting Companies Limited for the year to March 28, 1959, is £23,818 (loss £13,658), plus £6,440 (nil) against losses on assets realised. The Chairman, Mr. K. B. Taylor, says that losses are still being made and the Board favours discontinuance of manufacturing.

Costa Rica Railway Co. Ltd. Dividend.—Payment is being made of 3½ per cent interest on the 6½ per cent second debentures of the Costa Rica Railway Co. Ltd. These payments, out of profits for the year ended June 30, 1959, are on account of arrears for the year to June 30, 1945. It is hoped that after audit of the accounts for the year a further payment will be made in 1960.

Level Crossing over Lincoln Main Street Closed.—As a result of the opening of the Pelham Bridge, the flyover for vehicular traffic opened by the Queen last year, the "Durham Ox" level crossing at the East end of Lincoln Central Station, British Railways, Eastern Region, has been closed, as has the pedestrian footbridge across the railway at that point. It is intended to erect fences across the road on each side of the crossing and to remove the footbridge later.

New Premises for Angel Truck Co. Ltd.—The Angel Truck Co. Ltd. has acquired a large modern factory at 242-244, Billet Road, Walthamstow, E.17. One section of metalwork fabrication is already in operation and the Woodwork Section will move in this month. The complete move of offices will be completed before 1960. The new premises will enable the company to treble the present production of lifting and handling equipment within two years.

Electronic Computer for Wolverton Works Accountants Office.—Tests are being made with an Elliott "405" electronic computer in Wolverton Carriage & Wagon Works Accountants Office, British Railways, London Midland Region. This is to take over the accountancy of the department by stages. It must necessarily involve some redundancy in due course. The management of the London Midland Region emphasises that there will be no dismissals, as those who become redundant will occupy vacancies arising from retirements or will take over other work in the same office. The initial applications of the machine will be in stages, taking two years to complete. It will be five years before it can be used to its full potential. The installation is the first one of its kind on British Railways.

Formation of B.I.C.C.-Burndy Limited.—British Insulated Callender's Cables Limited has signed an agreement with the Burndy Corporation of Norwalk, Connecticut, U.S.A., to form a new company in the United Kingdom, B.I.C.C.-Burndy Limited. The new company has been formed to manufacture and market the existing range of Burndy products in the U.K. and other parts of the British Commonwealth. It will be in a position to supply all types of electrical connectors for electricity transmission, distribution and power station work, and for manufacturers of switchgear and appliances. The Burndy Corporation has evolved products to cover every type of electrical connection in a variety of materials. The association with B.I.C.C. brings advanced techniques for solderless connectors and terminations to British industry. Manufacture in Britain will begin in January, 1960, but initial supplies to American standards will be available for test almost immediately.

Eastern Region Pre-electrification Work Poster.—The Public Relations & Publicity Department, British Railways, Eastern Region, has issued a poster illustrating the pre-electrification engineering work completed and in progress on the Hertford North line. The work in hand, for which a completion date of mid-January, 1960 is given, includes track lowering under six bridges between Palmers Green and Grange Park Stations, and platform lowering at Palmers Green and Winchmore Hill Stations.

Special Train to Boston, Lincs., for American H.A.C. Party.—A special train bearing the name "The Ancient and Honorable Artillery Company, Massachusetts, Express" conveying some 200 members of the Ancient & Honorable Artillery Company of Boston, Massachusetts, in uniform, was run by British Railways, Eastern Region, from Kings Cross to Boston, Lincs., and back on October 4. The American visitors, in Europe to celebrate their company's 322nd Annual Fall Field Tour of Duty, visited Boston at the invitation of the Mayor.

Closing of Scottish Goods Branch Lines.—With the approval of the Transport Users' Consultative Committee for Scotland, the goods stations at Strathblane, Blanefield, Dumgoyne (and Blackburn Siding), Killearn, Balfron, Buchlyvie, Gartmore, and Aberfoyle, on the Aberfoyle branch, were closed on October 5. On the same date Gargunnock, Kippen, and Port of Menteith goods stations were closed on the Port of Menteith, and Caldarvan and Drymen goods stations on the Drymen branch. Alternative arrangements are in operation for parcels and merchandise by passenger train and for smalls and wagon load traffic.

Mobile Platforms for Carriage & Wagon Workshops.—The need for "tailor-made" mobile platforms giving easy access to railway wagons ready for painting at a British Railways' works has been met by two men using Dexion slotted angle. Working in off-peak hours two men of the Derby Carriage & Wagon Works maintenance staff built two mobile platforms in the total time of one day. The cost of the framework, using Dexion "300" and "225," was £40. The length of each mobile platform is 25 ft., height 5 ft., and width 1 ft. 9 in. Mobile staging is playing a large part in the building and maintenance of railway carriages, wagons and diesel locomotives.

Institute of Transport Presidential Address.—Mr. R. G. Grout, Chairman, General Steam Navigation Co. Ltd., will deliver his Presidential Address to the Institute of Transport at the Inaugural Meeting of the 1959-60 Session, to be held on Monday, October 12, 1959, at 5.45 for 6.15 p.m. in the Jarvis Hall of the Royal Institute of British Architects, 66 Portland Place, London, W.1.

Farewell Luncheon to Mr. E. S. Spackman.—A farewell luncheon has been arranged at the Dorchester Hotel, London, W.1, on October 14, for Mr. E. S. Spackman, European Passenger Manager, Canadian Pacific Railway, on his retirement. The price of tickets is 30s. per person. Application should be made to Mr. Shirley H. James, 4, West Halkin Street, Belgrave Square, S.W.1.

New Staff Buildings and Offices at Newton Abbot Running Depot.—Staff buildings and offices under construction at Newton Abbot Running & Maintenance Depot, British Railways, Western Region, will provide much-improved amenities for engine crews and other members of the staff at the depot. The premises will consist of a brick and concrete building of two floors and accommodate 448 men. Besides offices, the ground floor will include a large lobby, opening from which is the enginemen's duty (waiting) room and ranges of individual food storage lockers. A large mess-room, equipped with cookers, is on the first floor, also a locker room containing individual heated clothes lockers, and a washroom with showers, circular wash fountain, hot-air hand driers and so on. The building also includes a room for engine cleaners, fitters' workshop, stores, and a first-aid room. Heating and hot water are provided by oil-fired installations. Individual Ascot heaters serve isolated wash basins. The décor has been chosen for ease in maintenance and cleanliness. Use has been

Two mobile platforms built from Dexion slotted angle at British Railways, London Midland Region, Carriage & Wagon Works, Derby

made of yellow, white and grey glazed tiles, pre-cast stone paving, red quarry tiles and latex rubber flooring, resulting in bright and cheerful surroundings. Acoustic tiles in the mess room, enginemen's room, and offices absorb airborne noises. The improved Dowty "Spat" roof washers, described in our May 15 issue, are used in the structure. Improvements have also been carried out to adjoining offices, stores and lavatories. Covered bicycle racks have been erected. The building was designed and supervised by Mr. H. E. B. Cavanagh, A.R.I.B.A., Regional Architect, under the direction of Mr. M. G. R. Smith, M.I.C.E., Chief Civil Engineer, British Railways, Western Region. The general contractors are Staverton Contractors Limited, of Totnes.

New B.I.M. Regional Office.—The sixth regional office of the British Institute of Management has been opened in Bristol at St. Giles House, Quay Street, tel. Bristol 24763. It is the headquarters of the South Wales & West of England Regional Council of B.I.M., the Chairman of which is Mr. R. Ashley Hall, Deputy-Chairman of Jenson & Nicholson Group Limited. The region covers Cornwall, Devon, Gloucestershire, Somerset, Wiltshire, and in Wales, Brecknockshire, Monmouthshire, Glamorganshire, Carmarthenshire, and Pembrokeshire. There are B.I.M. branches in Cardiff, Swansea, Bristol and Plymouth. The regional Manager is Mr. I. D. Cunningham.

Forthcoming Meetings

October 12 (*Mon.*).—Institute of Transport, at the Jarvis Hall, R.I.B.A., 66, Portland Place, W.1, at 5.45 for 6.15 p.m. Presidential Address by Mr. R. G. Grout.

October 13 (*Tue.*).—Permanent Way Institution, York Section, in the Railway Institute, York, at 6.45 p.m. "The Tilley lamp," talk and demonstration, by Mr. E. J. C. Atkinson, the Tilley Lamp Co. Ltd.

October 13 (*Tue.*).—The Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "Some aspects of locomotive fuel usage," by Mr. C. H. Attenborough.

October 13 (*Tue.*).—The Institute of Transport, Yorkshire Section, at the Station Hotel, York, at 6.30 p.m. Paper on "The shop front of transport," by Mr. W. H. Vine.

October 14 (*Wed.*).—Peterborough Railway Discussion Group, at the Peterborough Technical College, Eastfield Road, at 6.45 p.m. Paper on "Railway trade unions' approach to modernisation," by Mr. C. W. Evans, President, National Union of Railwaymen.

October 14 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas' Street, S.E.1, at 5.45 for 6 p.m. Opening night. Guest speaker, Major-General Wansbrough-Jones, Secretary-General to the British Transport Commission, will address the society on "Modernisation in perspective." Mr. C. P. Hopkins will preside.

October 14 (*Wed.*).—Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, W.C.2, at 6 p.m. Paper on "Signalling equipment on 50 cycle electrified lines," by Mr. W. M. Sweetenham.

October 15 (*Thur.*).—Diesel Engineers & Users' Association, at the Memorial Building, The Institute of Marine Engineers, 76, Mark Lane, E.C.3, Annual General Meeting, at 2 p.m., followed by an informal discussion on "Users' problems," at 2.30 pm.

October 17 (*Sat.*).—Permanent Way Institution, York Section, in the Railway Institute, York, at 6.45 p.m. Northern Conversazione.

October 19 (*Mon.*).—Railway Correspondence & Travel Society, West Midlands Branch, at 64, Holyhead Road, Coventry, at 7.30 p.m. Paper on "Railway highlights of 1958," by Mr. W. A. Camwell.

October 20 (*Tue.*).—The Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, S.W.1, at 5.30 p.m. Paper on "Aluminium technology and railway rolling stock," by Mr. K. P. Brockway.

October 21 (*Wed.*).—The Institute of Fuel, at the Institution of Civil Engineers, Great George Street, London, S.W.1, at 5.30 p.m. Paper on "The use of oxygen in combustion processes with particular reference to the steel industry," by Mr. T. C. Churcher, British Oxygen Research & Development Limited.

October 21 (*Wed.*).—Permanent Way Institution, London Section, at the Headquarters of the British Transport Commission, 222, Marylebone Road, N.W.1, at 6.30 p.m. Paper on "The use of track tampers," illustrated, by Mr. D. G. C. Walker.

October 21 (*Wed.*).—Peterborough Railway Discussion Group, at Eastfield Road, at 6.45 p.m. Paper on "Temple Mills—does it ?" by Mr. H. W. Few, Traffic Manager, Eastern Region, Liverpool Street.

October 22 (*Thur.*).—British Railways, Western Region, London Lecture and Debating Society, in the headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Paper on "Development of an industry—the story of T. Wall & Sons Ltd.," by Mr. C. W. Road, member of Western Area Board of the B.T.C.

October 22 (*Thur.*).—Institution of Civil Engineers, at Great George Street, Westminster, S.W.1, at 5.30 p.m. Informal discussion on "The problems of measurement on civil engineering works," introduced by Mr. James Martin and Mr. B. K. Clancy.

October 24 (*Fri.*).—Institution of Railway Signal Engineers, Bristol Section. Visit to Severn Tunnel Hump Yard and the tunnel pumping station at Sudbrook.

Railway Stock Market

There was surprisingly little selling in stock markets in front of the general election result, and compared with a week ago, many leading industrial shares have moved higher on balance. Some reached new high levels. In fact, a fresh peak was recorded by *The Financial Times* industrial ordinary share index. Buying was not exceptionally strong, but with little selling in evidence, it had a pronounced effect on share values.

Movements in foreign and other rails were once again small and without any special significance. Costa Rica ordinary stock, for instance, remained at 17½ with the first debentures 80½ and the second debentures 88½xd. Paraguay Central first debentures eased from 22 to 20. Elsewhere Brazil Railway bonds have strengthened from 5¾ to 6¼.

Antofagasta ordinary at 13½ was the same as a week ago, as was the preference stock at 23 and 5 per cent (Bolivia) debentures at 92½. International of Central America rallied from $18½ to $22½ and the preferred stock from $101½ to $105½. United of Havana consolidated stock kept at 6. Mexican Central "A" bearer debentures moved fractionally lower at 57. In other directions San Paulo Railway 3s. units eased from 1s. 7½d. to 1s. 6d. Chilean Northern 5 per cent first debentures were again quoted at 60.

Canadian Pacifics strengthened to $48⅞, at which there is a yield of fully 5⅛, not unattractive compared with the yields on many other leading dollar stocks. The 4 per cent preference at 56¾ yield 7 per cent; this is generous, even allowing for the fact that the dividend on this stock is non-cumulative. The 4 per cent debentures at 62¾ yield over 6¼ per cent. White Pass shares kept at $13¾.

Nyasaland Railways shares were again 10s. 6d. The 3½ per cent debentures were 55. West of India Portuguese capital stock was 105½xd.

Buyers have again been in evidence for Westinghouse Brake shares, which rallied well from 48s. 6d. a week ago to 49s. 9d. G. D. Peters continued to be quoted at 18s. 1½d. despite the decision not to pay an interim dividend, which was not unexpected in view of the falling off in the demand for vacuum brakes and so on from British Railways.

Benefits from widening of the company's activities will take time to accrue, but there is a sound balance-sheet position and there is little doubt that earning power will recover in due course, though as regards the current year it is impossible to say whether the final dividend is likely to be maintained at 7½ per cent. Last year an interim of 2½ per cent was paid.

Gloucester Wagon 10s. shares have been steady at 16s.xd. Beyer Peacock 5s. shares rallied from 7s. 9d. to 8s. Wagon Repairs 5s. shares came back from 10s. to 9s. 9d. North British Locomotive remained at 11s. and Birmingham Wagon at 30s. 1½d. Charles Roberts 5s. shares moved up from 13s. to 13s. 6d.xd.

Pressed Steel 5s. shares were good, having risen on balance from 31s. 6d. to 33s. 3d. Dowty Group 10s. shares also were good at 38s. 6d., compared with 37s. 9d. a week ago. T. W. Ward put on 1s. at 101s. while buying of Davy-United continued and advanced the price further to 95s.

Ransomes & Marles 5s. shares held last week's advance to 23s. 6d. and Vickers rallied from 27s. 4½d. to 28s. 4½d. B.I. Cables rose to 54s. Stone-Platt Industries strengthened to 51s. and Reyrolle gained 1s. at 93s.

Associated Electrical were firm at 60s. 6d.xd, with General Electric 9d. higher at 39s. 9d., Crompton Parkinson 5s. shares were 14s. English Electric rose on balance from 42s. 6d. to 43s. 9d.

OFFICIAL NOTICES

FOR hire Hudswell Clarke 0-6-0 Standard Gauge Steam Loco. Apply Eagre Construction Co. Ltd., Scunthorpe, Lincs. Phone 4513—7 lines.

MANCHESTER CORPORATION TRANSPORT DEPARTMENT REQUIRE

Outside representative for the Parcels Section. Applicants must have experience of the Road Haulage Industry particularly in the carriage of smalls and also a good knowledge of the City and Suburban Areas. Duties include canvassing for new traffic, liaison between Department and Warehouses and Wholesale distributors and investigation of claims. Salary £765/£880 (A.P.T. II).

Applications to General Manager, 55, Piccadilly not later than Monday 12th October, 1959.